

E. B. Peirson. M.D.
with the regards of
J^{rs} F. Norland.

Dec^r 10th 1847.

ELEMENTS
OF
GENERAL PATHOLOGY.

1880

THE NEW YORK PUBLIC LIBRARY

ASTOR LENOX TILDEN FOUNDATION



500 N. 5TH ST. N. Y. C.



ELEMENTS

OF

GENERAL PATHOLOGY.

BY A. F. CHOMEL,

PROFESSOR OF CLINICAL MEDICINE TO THE FACULTY OF PARIS; CONSULTING PHYSICIAN
TO THE KING; PHYSICIAN IN ORDINARY TO THE PRINCESS ROYAL; OFFICER OF
THE LEGION OF HONOR; HONORARY PHYSICIAN OF THE HOSPITALS;
MEMBER OF THE ROYAL ACADEMY OF MEDICINE; AND
OF MANY OTHER ACADEMIES AND LEARNED
SOCIETIES, NATIONAL AND FOREIGN.

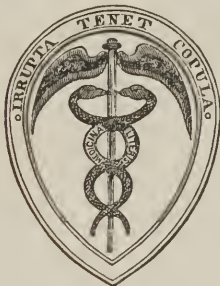
Melius est sistere gradum quam progredi per tenebras. — GAUBIUS.

THIRD EDITION, CONSIDERABLY ENLARGED.

TRANSLATED FROM THE FRENCH

BY F. E. OLIVER, M. D., AND W. W. MORLAND, M. D.,

Members of the Massachusetts Medical Society.



BOSTON:
WILLIAM D. TICKNOR AND COMPANY.

CORNER OF WASHINGTON AND SCHOOL STREETS.

M DCCC XLVIII.

Q Z

C 548e

1848

Entered according to act of Congress, in the year 1847, by
F. E. OLIVER, AND W. W. MORLAND.
in the Clerk's Office of the District Court of the District of Massachusetts.

B O S T O N ·
PRINTED BY THURSTON, TORRY AND CO.
31 Devonshire Street.

TO

JAMES JACKSON, M. D.

PROFESSOR EMERITUS OF THEORY AND PRACTICE OF PHYSIC IN HARVARD UNIVERSITY,

HONORARY MEMBER OF THE ROYAL MEDICAL AND CHIRURGICAL SOCIETY, ETC. ETC.,

DISTINGUISHED ALIKE FOR HIS PRIVATE VIRTUES, PROFESSIONAL EMINENCE,

AND HIS UNWEARIED AND INVALUABLE LABORS IN THE

CAUSE OF MEDICAL SCIENCE,

THIS TRANSLATION

IS, BY PERMISSION,

MOST RESPECTFULLY DEDICATED.

TRANSLATORS' PREFACE.

THE classical work now first presented to the medical public in the form of a translation, can need no other recommendation to secure its cordial reception, than the name and reputation of its celebrated author. We may hazard an expression of surprise that it has so long remained unclothed with a garb, which would have introduced it more universally to the profession in this country. With precepts of inestimable value to the student, it combines a vast collection of details interesting to the practitioner. Whoever has followed the author in his clinical practice, and remarked his admirable qualities as a diagnostician of disease, his unfailing detection of the most obscure symptoms, his accurate prognosis, and remarkable skill in exhibiting and explaining cadaveric lesions, will readily discover, in the present work, the reflection of his practical labors.

We trust that our task, by no means a light one, has been, at least, faithfully performed. The few additions, in the form of notes, relate chiefly to new discoveries in medical science, announced since the appearance of the last French edition, or to questions still undecided, and consequently open to remark.

BOSTON, NOVEMBER 12, 1847.

AUTHOR'S PREFACE.

GENERAL PATHOLOGY treats of diseases considered abstractly, or in regard to that which is common to them all. It serves at once as introduction and sequel to special or descriptive pathology, whose end is the knowledge of each particular malady to which man is subject. It comprehends all that is most simple, and likewise what is most elevated in science; on the one hand, the definition of terms and the description of the phenomena of disease; on the other, the discussion of all those fundamental questions and the exposition of those general principles, which are to guide the physician in the arduous practice of a profession closely connected with the dearest interests of humanity. General Pathology, consequently, comprises within itself the most unpretending elements and the most exalted philosophy of medicine.

In this new edition we have not departed from the *plan* and *rules* which were adopted in those preceding it. We have treated of disease in general, as we should of any one malady in particular, when intending to give the most complete account of it possible.

The definition of disease in general, and the mode of defining each one in particular; the nomenclature, seat, causes, and precursory phenomena of diseases; their symptoms, progress, duration, and varied terminations; convalescence, consecutive phenomena, relapse, and recurrence; the distinction of genus,

of species, and of pathological varieties; complications, diagnosis, prognosis, anatomical changes, and treatment; the intimate nature of diseases, their classification, and the examination of the principal works upon general pathology, are each the subject of a special chapter.

We resolved, in the first edition of this work, to abstain from any systematic idea, and to adhere strictly to the narration of facts, and the consequences rigorously deduced from them. We dare not flatter ourselves that we have completely accomplished this, but perhaps may be permitted to think that a near approach to it has been made. In fact, in the midst of the immense progress which medicine has made in its positive truths, and the great revolutions which it has undergone in its theories, we have not erased, in this new edition, anything essential of what the first contained, which was published in 1817, twenty-three years ago. If, however, but little of the former has been suppressed, we have been obliged to make, in this, the third edition, numerous and important additions. Within the lapse of twenty-three years, auscultation has been discovered; percussion, perfected in its manœuvres, has been extended in its applications; the observation of pathological phenomena during life, and the study of anatomical lesions after death, have been brought to a degree of precision, which, previously, they did not possess, and have furnished us with many new facts; chemistry and the microscope have lent their aid to pathology; most positive consequences have been deduced from the comparison and enumeration of better observed facts; diagnosis has become more exact, and experiment more rigorous. We have sought, in this new edition, to omit nothing of whatever important conquests have been made by science: this has been a long and difficult task, in the midst of the duties of medical teaching and the demands of practice. Thus, even with the assistance of two young and highly distinguished physicians, MM. Dalmas and Grisolle, who have kindly made, in the works recently published, the necessary researches for the

present volume, six years have elapsed, from the time when the preceding edition was exhausted, to the publication of the present one.

This new edition is far more extended than the second. The chapters devoted to the causes, the symptoms, and the progress of diseases, have been subjected to important modifications, and have received considerable additions. We have given to the chapter on Diagnosis a new form and very great development: the part relating to therapeutics has been greatly augmented; and we would particularly mention two articles, — one, devoted to the exposition of the rules of experiment in medicine; and the other, to the examination of a question sharply contested, — the application of the numerical method to pathological facts.

PARIS, OCTOBER 21, 1840.

CONTENTS.

CHAPTER I.

PATHOLOGY, ITS IMPORTANCE, EXTENT, AND DIVISIONS. — GENERAL PATHOLOGY, ITS EXTENT AND LIMITS ; THE ADVANTAGES AND DANGERS ATTENDING ITS STUDY ; MODE OF ITS EXPLICATION	1
---	---

CHAPTER II.

GENERAL AND SPECIAL DEFINITIONS OF DISEASE	6
--	---

CHAPTER III.

NOMENCLATURE OF DISEASES. — SYNONYMY. — ETYMOLOGY	13
---	----

CHAPTER IV.

SEAT OF DISEASES	16
----------------------------	----

CHAPTER V.

ETIOLOGY, OR THE CAUSES OF DISEASE	19
--	----

ARTICLE I.

Determining causes	21	Planetary influences	34
Common determining causes	21	Localities	34
Circumfusa	22	Garments	36
Applicata	23	Food	36
Excreta, gesta, percepta	24	Moral affections	36
Specific determining causes	25	Political institutions	36
Common specific causes	25		
Metallic emanations	25	SECTION II.	
Miasmatic exhalations	25	Individual predisposing causes	36
Poisons	26	1. Aptitudes	37
Contagious specific causes or virus	26	A. Origin	37
		B. Age	39
		C. Climacteric years	40
		D. Sex	41
		E. Temperament	41
		F. Constitution	42
		G. Habits	42
		H. Occupation	43
		I. Affluence and poverty	43
		J. Healthy, convalescent or diseased condition	43
		K. Pregnancy	44
		2. Individual predisposing causes proper	44

ARTICLE II.

Predisposing causes	31
-------------------------------	----

SECTION I.

General predisposing causes	32
Atmosphere	32
Winds	32
Atmospheric pressure	33
Light	33
Electricity	33
Seasons	33

A. Circumfusa (dissect'g rooms, hospitals, change of climate)	44	Determining causes . . .	55
B. Applicata (clothing, various causes of compression, beds, baths)	45	Aptitudes . . .	57
C. Ingesta (food, drinks, spices, condiments, medicaments)	48	Predisposing causes proper	58
D. Excreta (evacuations)	50	Occasional causes . . .	63
E. Gesta (exercise, repose, fatigue, want of exercise, watching, sleep)	51	ARTICLE V.	
F. Percepta (sensations, passions, mental exertion, antecedent diseases)	52	Division of diseases relatively to their productive causes . . .	64
ARTICLE III.		Innate or congenital diseases . . .	64
Occasional or exciting causes . . .	53	Acquired diseases . . .	64
ARTICLE IV.		Sporadic diseases . . .	64
Mode of action of the different mor- bific causes . . .	55	Pandemic diseases . . .	64
		Endemic diseases . . .	64
		Epidemic diseases . . .	65
		Essential diseases . . .	69
		Symptomatic diseases . . .	69
		ARTICLE VI.	
		Lapse of time between the applica- tion of the causes and the de- velopment of diseases . . .	69

CHAPTER VI.

PRECURSORY PHENOMENA, PRELUDES, ANTECEDENT SIGNS, PRODROMES, OR IMMINENCE OF DISEASES	70
---	----

CHAPTER VII.

SYMPTOMS OR SYMPTOMATOLOGY	72
ARTICLE I.	
Symptoms furnished by the func- tions of relation	75
SECTION I.	
Symptoms furnished by the exter- nal appearance	75
A. Attitude	75
B. Volume of the body	76
C. Growth of the body	77
D. Firmness of the flesh	78
E. Color of the skin	78
F. Eruptions	80
G. Plicatures	80
H. Tumors, excoriations, fis- sures, ulcers, fistula	80
Symptoms furnished by the head	81
Symptoms furnished by the neck	90
Symptoms furnished by the chest	91
Symptoms furnished by the shoul- ders	91
Symptoms furnished by the abdo- men	92
Symptoms furnished by the organs of generation	94
Symptoms furnished by the limbs	95
SECTION II.	
Symptoms furnished by the organs of locomotion	97
Bones	97
Muscles, (paralysis, tremor, ri- gidity, subsultus, carphology, convulsions, contraction, etc.)	98
SECTION III.	
Symptoms furnished by the voice and speech	102
SECTION IV.	
Derangements of sensibility and of sensation considered as symp- toms	104
Internal sensations (pain)	105
External sensations	108
A. Sight	108
B. Hearing	109
C. Smell	109
D. Taste	109
E. Touch	109
SECTION V.	
Symptoms furnished by the affec- tive functions	110
SECTION VI.	
Symptoms furnished by the intel- lectual functions (delirium)	111
SECTION VII.	
Symptoms furnished by sleep (sleeplessness, dreams, som- nolency, coma, etc.)	113

SECTION VIII.

Lipothymia, syncope, vertigo . . . 115

ARTICLE II.

Symptoms furnished by the internal or assimilative functions . . . 116

SECTION I.

Symptoms furnished by digestion . . . 117

A. Hunger 117

B. Thirst 118

C. Examination of the various parts of the mouth . . . 118

The teeth 118

The gums 119

The tongue 119

D. Mastication 123

E. Deglutition 123

F. Stomachal digestion . . . 125

1. Nausea 125

2. Subsultus præcordiorum . . 125

3. Regurgitation 125

4. Vomiting 126

5. Pain 127

Symptoms furnished by the intestinal canal . . . 128

1. Borborygmi 128

2. Gurgling 128

3. Passage of alimentary substances 129

4. Alvine excretion or defecation 129

5. Excreted substances or excrements 131

SECTION II.

Symptoms furnished by the respiration 134

1. Frequency 134

2. Quickness 135

3. Quantity of air inspired and expired 135

4. Difficulty of respiration . . 135

5. Inequalities of respiration . 136

6. Concomitant sounds . . . 136

7. Qualities of the expired air . 137

8. Auscultation 137

Modifications of the respiratory murmur . . . 140

Rales 140

Metallic tinkling 145

Thoracic succussion 146

Pleuritic friction sound . . . 147

Auscultation of the voice . . 148

Bronchophony 148

Ægophony 149

Pectoriloquy 150

Percussion of the chest . . . 151

§ II. Respiratory phenomena . . 152

1. Laughter 152

2. Yawning 152

3. Sneezing 152

4. Hiccough 152

5. Cough 152

Exspuition 154

Expectoration 154

Sputa 155

SECTION III.

Symptoms derived from the circulation 162

§ I. Circulation of the blood . . 163

A. The heart 163

1. Extent of the heart's pulsations 164

2. Shock or impulse 165

3. Nature and intensity of the sound 166

4. Rhythm 169

B. The Pulse 170

Auscultation of the arteries . 179

C. Symptoms furnished by the capillary circulation . . . 180

D. Symptoms furnished by the venous circulation . . . 181

E. Symptoms furnished by the examination of the blood . . 182

§ II. Symptoms furnished by the lymphatic system . . . 189

SECTION IV.

Symptoms furnished by the heat . . 192

SECTION V.

Symptoms furnished by the exhalations and secretions . . 195

§ I. Exhalations 196

A. Natural exhalations . . . 196

1. Cutaneous exhalation, or perspiration 196

2. Mucous exhalation 198

3. Serous exhalation 199

4. Exhalations upon the articular surfaces 199

5. Exhalations within the eye, the ear, the adipose cells, the lymphatic and sanguineous system, etc. . . . 200

7. Gaseous exhalation 200

8. Sanguineous exhalation . . . 200

B. Morbid exhalations . . . 200

1. Hæmorrhage 200

2. Pyogenia 201

Pus considered in regard to its chemical properties and its action upon the animal economy . . . 204

C. Artificial exhalations . . . 206

§ II. Secretions, properly so called . 206

1. Secretion of tears and the fluid of the meibomian follicles 207

2. Secretion of the saliva . . . 207

3. Secretion of the bile 208

4. Secretion of the pancreatic juice	210	ARTICLE III.	
5. Secretion of the urine	210	Symptoms furnished by the generative functions	223
Physical and chemical properties of the urine	212	A. In the male	224
§ III. Excretions	219	B. In the female	224
SECTION VI.		ARTICLE IV.	
Symptoms furnished by absorption	220	Symptoms considered in disease	226
SECTION VII.		Local and general symptoms	227
Symptoms furnished by nutrition	222	Sympathetic phenomena ; sympathies	227
Augmentation (hypertrophy)	222	Principal and accessory symptoms	228
Diminution (atrophy)	222	Active and passive symptoms	229
		Epiphenomena	229

CHAPTER VIII.

THE PROGRESS OR COURSE OF DISEASES	230		
Types	231	Circumstances which modify the course of diseases (ages, temperament diurnal revolutions, temperature, planetary influences, climate, etc.)	236
Acute and chronic course	233		
Periods in diseases	233		
Invasion	234		
Period of stasis or violence	235		
Period of decline	235		

CHAPTER IX.

DURATION OF DISEASES	240		
--------------------------------	-----	--	--

CHAPTER X.

TERMINATION OF DISEASES	242		
ARTICLE I.		Circumstances which favor or oppose critical phenomena	252
Different modes of termination	242	Duration of critical phenomena	252
In the return to health	242	Influence of critical phenomena upon the termination of diseases	253
In death	244		
In another disease	245	ARTICLE II.	
Doctrine of crises	246	Doctrine of critical days	256
Seat of critical phenomena	247		
Precursory signs of critical phenomena	249		

CHAPTER XI.

CONVALESCENCE	259		
-------------------------	-----	--	--

CHAPTER XII.

CONSECUTIVE PHENOMENA	262		
---------------------------------	-----	--	--

CHAPTER XIII.

RELAPSE AND RECURRENCE	264
----------------------------------	-----

CHAPTER XIV.

THE DIFFERENT GENERA, SPECIES AND VARIETIES OF DISEASES	266
---	-----

CHAPTER XV.

COMPLICATIONS	270
-------------------------	-----

CHAPTER XVI.

DIAGNOSIS	273
---------------------	-----

§ I. Diagnostic signs	273	Exploration of the rectum	310
§ II. Necessary conditions on the part of the patient and the physician in forming a diagnosis	275	Exploration of the limbs	310
Different modes of exploration for forming diagnosis	276	§ IV. Principal component elements of diagnosis	311
1. Pressure	276	A. Determination of the seat of diseases	312
2. Palpation	278	1. Which is the affected organ?	312
3. Touch	280	2. The seat of disease being known, what is its extent?	314
4. Succussion	282	3. Which of the elementary tissues is primarily affected?	315
5. Mensuration	283	B. Determination of the lesion	316
6. Percussion	286	1. Nature of the lesion	317
7. Auscultation	290	2. Degree attained by the lesion	318
8. Exploration by sounds and probes	293	C. Symptomatic phenomena considered in regard to diagnosis	319
9. Exploration by specula	294	§ V. Circumstances which may render diagnosis difficult and even uncertain	321
10. Examinations with the microscope and the magnifying glass	297	1. Difficult diagnosis on account of the period at which the physician is summoned	321
11. Employment of chemical agents in the diagnosis of disease	297	2. Difficulties in diagnosis depending upon the predominance of general phenomena, or the obscurity or absence of local phenomena	323
§ III. Mode of examination and interrogation of patients for the purpose of forming a diagnosis	298	The febrile state in relation to diagnosis	330
Order to be observed in questioning patients	301	3. Difficulties in diagnosis resulting from the infrequency of the disease	336
Examination of the existing symptoms	302	4. Difficulties resulting from complications	337
Exploration of the head	303	5. Difficulties resulting from deception	338
Exploration of the spine	303	Feigned and concealed diseases	338
Exploration of the auditory canal	304		
Exploration of the nasal fossæ	304		
Exploration of the isthmus of the fauces, the larynx and the œsophagus	305		
Exploration of the chest	306		
Exploration of the abdomen	308		
Exploration of the genital organs	309		

CHAPTER XVII.

PROGNOSIS	341
§ I. Conditions on the part of the patient and the physician for the formation of the prognosis	341
§ II. Prognostic signs	342
1. Diagnosis the original basis of prognosis	343
2. Power of nature and of art	344
3. Age, previous health, physical and moral causes	344
Hereditary condition	345
Menstruation, pregnancy, the puerperal state	345
Habitual intemperance	345
Excessive evacuations — fatigue	346
Climate — seasons	346
4. Precursory phenomena	346
5. Commencement of diseases	346
6. Progress of diseases	347
7. Duration of diseases	347
8. Influence of remedies previously employed	347
9. Complications	347
Prognostic value of certain symptoms considered separately (external appearance, aphonia, pain, sensorial disturbance, delirium, sleep, dysphagia, hunger, thirst, meteorism, involuntary evacuations, stertorous respiration, syncope, sweats, hæmorrhage, parotiditis)	348

CHAPTER XVIII.

THE DIFFERENT ALTERATIONS PRESENTED BY THE ORGANS AFTER DEATH	357
ARTICLE I.	
Mode of conducting post-mortem examinations	358
Examination of the exterior of the body	358
Inspection of the internal organs	359
Mode of opening the great splanchnic cavities	360
Order in which visceral inspection should be conducted	361
ARTICLE II.	
The principal lesions presented by the organs after death	365
FIRST SERIES.	
Lesions of the solids	365
Inflammation of the various tissues	366
Ulcers	367
Fistula	368
Gangrene	368
Tubercle	368
Granulations	369
Cancer	370
SECOND SERIES.	
Alterations of the fluids	374
Alterations of the liquids	374
Alterations of the gases	377
THIRD SERIES.	
Foreign bodies, inanimate and living	378
Different importance of cadaveric changes	379

CHAPTER XIX.

THERAPEUTICS	380
Observation and experience the only guides in the study of therapeutics	381
Experimentation, its difficulties, the requisite rules in its pursuit	383
The numerical method applied to the study of diseases	393
Refutation of the principal objections to the numerical system	395
Experience in medicine	403

Physical and chemical theories applied to therapeutics . . .	405	M. Epidemic constitution . . .	419
ARTICLE I.		N. Tendency of the disease . . .	419
Indications	406	O. Influence exercised by the disease upon the constitution	420
Conditions productive of indications	406	Possibility of the occurrence of several indications in one and the same disease	420
A. Genus of the disease	406	Preservative indications	422
B. Character of the disease	407	Principal indications in convalescence	423
C. Type of the disease	407	Indications furnished by the consecutive phenomena	423
D. State of the vital forces	408	ARTICLE II.	
E. Intensity of the disease	412	Therapeutical means	423
F. Different periods of the disease	412	Therapeutical means, properly so termed	424
G. Particular symptoms	413	Surgical means	424
H. Seat of diseases	414	Medical means	425
I. Complications	414	General or hygienic means	428
J. Causes	414	Means in acute diseases	429
Temperament, constitution, age, sex, profession, habitual regimen	415	Means in chronic diseases	434
K. Commemorative circumstances	416		
L. Means previously employed	418		

CHAPTER XX.

NATURE OR ESSENCE OF DISEASES	435
Ideas of the humoral pathologists	437
Ideas of the Solidists	438

CHAPTER XXI.

CLASSIFICATION OF DISEASES	442
--------------------------------------	-----

CHAPTER XXII.

PRINCIPAL WORKS UPON GENERAL PATHOLOGY	441
--	-----

INDEX	451
-----------------	-----

ERRATA.

- Page 80, lines 19 and 23, for "vesicula," read *vesiculæ*.
" 101, line 16, insert a comma after "attacks."
" 115, lines 11 and 32, for "Topor," read *Sopor*.
" 117, line 21, for "boulimus," read *boulimia*.
" 117, lines 24 and 26, *delete* the parentheses.
" 123, line 25, for "sound," read *sounds*.
" 136, note, for $\pi\epsilon\iota\omega$, read $\pi\tau\epsilon\omega$.
" 132, line 35, for "Nosographic," read *Nosographie*.
" 136, line 13 from bottom, for "secretions," read *secretion*.
" 139, line 20, for "Seltzar," read *Seltzer*.
" 139, line 4 from bottom, for § I. read § II.
" 197, line 30, for "mouldiness," read *mould*.
" 200, line 5 from bottom, for "hæmorrhages consist," read *hæmorrhage consists*.
" 203, line 7 from bottom, for "after," read *of the*.
" 213, line 30, for "a thousandth," read *of a thousandth*.
" 226, line 14, for "venerens," read *venerens*.
" 229, last line, for "epigenometa," read *epigenemeta*.
" 231, note, for $\psi\upsilon\varrho\epsilon\acute{\xi}\omicron\varsigma$, read $\pi\upsilon\varrho\epsilon\acute{\xi}\iota\varsigma$.
" 300, line 3 from bottom, for "diagnosing," read *diagnosticating*.

ELEMENTS

OF

GENERAL PATHOLOGY.

CHAPTER I.

PATHOLOGY, ITS IMPORTANCE, ITS EXTENT, AND ITS DIVISIONS. —
GENERAL PATHOLOGY, ITS EXTENT, ITS LIMITS. — ADVANTAGES AND
DANGERS ARISING FROM ITS STUDY. — ORDER ADOPTED IN ITS EXPO-
SITION.

PATHOLOGY has been defined to be that branch of medicine which treats of the classification, causes, symptoms and signs of disease. This definition is far from accurate. As it is the peculiar province of physiology to treat of whatever relates to the human body in its normal condition, so pathology includes within its limits whatever relates to the same in a state of disease. The seat of diseases, the phenomena which precede and follow them, their progress, duration and different modes of termination, their reappearance, various forms and complications, the changes they produce in the texture of organs, their prophylactic and curative treatment, &c. &c., are but so many essential points in their history, which necessarily fall within the cognizance of pathology,* or that branch of medical science, the object of which is the knowledge of disease.

Of the various branches of the healing art, none to the physician is so attractive as a study, none so important in its results, as pathology. He views it as a centre, around which are disposed at unequal distances the other natural sciences. The study of anatomy and physiology, of chemistry and physics, of botany and

* *Παθος*, disease ; *λογος*, discourse.

materia medica, afford him but an introduction to that of pathology; he regarding those sciences of far less importance, so soon as the latter shall become the object of his special study, viewing them rather as accessory sciences, and among the numerous facts presented by them, noting only those which are nearly connected with the knowledge of disease, and its appropriate methods of treatment.

We would not however exalt the science of pathology at the expense of the other branches of natural history; whatever be its importance, and the dignity of its aim, we claim for it no superiority over the other sciences. Physiology, physics, zoology, &c., it will not be denied, are entitled to equal consideration. Intimately connected as are all these sciences, they reciprocally aid in the elucidation of each other, and none among them should be allowed the preëminence, although in his estimation who makes it his particular study, either will appear of paramount importance.

Pathology, like the other natural sciences, is without limit; while botany, zoology, physics, chemistry and mineralogy are daily extending their domain, the science of disease, also, to the observer, appears to be rapidly advancing. Without here referring to the ever new and infinite varieties of disease, this must be evident, whether we consider the more careful study of causes, the more accurate description of symptoms, the more critical examination of the circumstances which exert a favorable or unfavorable influence upon the progress of diseases, the discovery of affections previously unknown or imperfectly described, or lastly, the application of new methods of exploration to the phenomena of disease. To cite a recent example, has not the discovery of auscultation, in our own time, added to the history of thoracic disease, a multitude of phenomena and valuable diagnostic signs, of which we were previously ignorant? Pathology presents for consideration, a mass of facts, all the details of which it is beyond the power of the human mind to comprehend; it may even be asserted that, throwing aside its theories and its systems, no one is possessed of all the knowledge contained in the records of pathological science.

This want of correspondence between the extent of the science and the capacity of the human mind, has led to results which were not unforeseen. It being impossible to increase the mental powers, it was attempted to make a division of the science into several parts which should be within the reach of our intellectual capacity. Hence the numerous divisions of pathology. Of these the most important is that distinctive of internal or medical, and external or surgical pathology. The diseases of women, of children, of the aged, those seated, whether in any of the splanchnic cavities, in any of the great anatomical systems, in an apparatus, or single organ, &c., have severally undergone subdivision; and eminent professional men have deigned to devote themselves exclusively to the study of a single class of these affections. But it should be recollected that, in no instance, has the investigation of a special group of diseases been of profit to the science, except so far as

those, who have devoted themselves to these studies, have been well versed in the other branches of pathology. Diseases are not confined in their effects to single organs, nor can they be disconnectedly studied.

There is another division, which has had the effect to enlarge rather than diminish the range of the science, and which, like that adopted by Bichat in the study of anatomy, has extended its limits. We refer to the division into general and descriptive pathology. The object of this is not to divide the science into several parts, nor to separate a particular class of diseases from all others. General pathology, whose object it is to treat of diseases in the abstract, and of whatever is common to them, includes all under the same head, studies their general characteristics, causes and development, the succession and connection of their phenomena observed during life, the appearances after death, and the circumstances which modify their progress, and by which we are enabled to prognosticate the changes which will take place in their course. Descriptive pathology includes alike all diseases, but presents them in a series of groups, in which each affection is described, with the appearances peculiar to it, and which serve to distinguish it from all others. Hence, it is evident that there is no analogy between this division of the subject, and those before mentioned. The latter shorten the study, by presenting fewer objects for investigation; the former leads to the same result without narrowing the limits of the science; and not only does it preserve it entire, but by presenting, under different aspects, the objects to which the attention should be successively directed, we obtain a more accurate knowledge and a more just appreciation of them.

This division differs also from the first in other respects. It is possible to devote ourselves exclusively to the study of internal, and neglect to a certain extent that of external pathology: so special study may be made of those diseases which occur during childhood or old age, while those peculiar to other periods of life are neglected. General and special pathology, on the contrary, cannot be exclusively studied; one is but an introduction to the other; both are indispensable to the physician.

This division of pathology is one, the limits of which are the most clearly defined. The consideration of all the phenomena common to diseases belongs to general pathology, while whatever relates to the history of particular diseases falls within the province of descriptive pathology. Between these two branches of pathology, there are however numerous points of contact; but it is not a little singular that most authors who have treated upon general pathology, should have introduced, among considerations legitimately within the province of that subject, the history of particular diseases. Thus the description of plethora is found in almost all treatises upon general pathology. Sprengel, in his valuable work* upon this subject, goes still farther, and treats

* *Pathologia Generalis*. Amstelodami, 1813.

successively (in the article, *Etiology*,) of the signs of the various fractures, dislocations, and herniæ, and describes the various kinds of worms which infest the human body, with the signs indicative of their presence. While subjects are thus considered in connection with general pathology, which are not within its scope, others strictly belonging to it are neglected. The nomenclature of diseases, the circumstances which influence their course, the treatment, convalescence, and appearances after death, the mode of examination and interrogation of patients, are all important points in the general history of diseases, which authors have hitherto omitted to mention, although as essential to it as the classification, causes, symptoms and signs.

If the division of pathology into general and descriptive, appear to some rather to prolong than to abridge the study of diseases, it will be an easy task to bring them to a more just conclusion. We readily grant that the knowledge of particular diseases is of the highest importance, and that the study of general pathology is not of equal utility to the practical physician. But admitting for a moment, that the latter be wholly valueless to him who is already versed in science, it would not be therefore just to conclude that it is without profit to the student. Without here referring to the absolute necessity of his first becoming familiar with a new language, the study of general pathology is to him in other respects of manifest utility; all is as yet new to him, he should leave no point unattained. Diseases possess certain forms in common, they have also features which are peculiar to them. Were it not better, we would then ask, to present to the beginner, once for all, the various points of doctrine, and the phenomena common to most diseases, and thereby avoid the necessity of afterward pointing out those peculiar to each, than to weary him with tedious and unprofitable repetitions, which, in the description of each particular disease, must necessarily lead to an incomplete examination of the same questions? In short, should he be made acquainted at once with the characteristics common to all diseases, or be under the necessity of reviewing the same, as often as he should be led to the investigation of a particular disease? The answer is evident.

There are still numerous other advantages attending the study of general pathology. It gives scope to considerations, favorable to the development of the understanding, and an enlargement of the views of the student. It briefly points out to him, at the commencement of his career, the path he should pursue, the objects which claim his attention, and the dangers to be avoided; it also indicates the course which should be adopted in the investigation of particular diseases; and lastly, by grouping together these various affections, it aids in the elucidation of their history.

But aside from the advantages, there are dangers connected with the study of general pathology. A cursory examination of the treatises upon this subject will alone suffice, to show us the systems and hypotheses, which have been either substituted for, or mingled with, the results of observation or experience. The same

may be said, it is true, of most medical treatises, whatever be their object, as descriptions of particular diseases, and even records of observations. But systems properly so called, those great hypotheses, by which the universality of facts is understood and explained, necessarily proceed from general pathology. The comparison of diseases, the study and comparison of their various phenomena, necessarily lead to those general conclusions so seductive to the mind, which receives them with dangerous facility, proudly proclaiming them as secrets wrested from nature, as laws without exception; and should they afterward be shown by facts to be inaccurate or false, to nature rather than to the theory is the error ascribed; the *freaks* and *caprices* of nature excite astonishment, while the theory is still regarded with admiration, until some other takes its place, which ultimately shares the same fate. When it is considered that general pathology treats of subjects abstractly, and that hence it becomes easy to wander from the truth, the tendency of this science to the formation of those theories by which the progress of medicine has been so long impeded, becomes manifest.

If the knowledge of the dangers be sufficient in order to avoid them, we hope that we ourselves have escaped from those to which we have just alluded; but whatever may have been our efforts to attain this end, we dare not flatter ourselves that we have succeeded. Those most averse to theories and hypotheses, have not in all cases been able to guard against them; they have overthrown the hypotheses of others, by substituting those of their own invention, and which appeared to them but the legitimate results of observation and experience. It was a remark of *Gaubius*, that it is better to pause, than go blindly forward; and yet, in the same work, he himself becomes enveloped in the mists of humorism, and gravely descants upon the chemical and mechanical acrimonies of the humors.

If, as we have seen, the province of general pathology has not been with certainty determined, and it be necessary to strip it of the erroneous and dangerous theories which have till now rendered it obscure, it is no less important that a far different course be adopted in its exposition, from that hitherto pursued. By referring, as has been the case, to nosology or the classification of diseases, their definition, seat, course, duration and complications, subjects are considered under the same head, which should be separately studied, and which are as widely different as signs and symptoms, from which two distinct branches have arisen; if, in connection with the nosology, the seat, progress and duration of diseases, which have but a vague affinity to their classifications, be considered, it is not clear why on this, all other branches of general pathology should not depend.

Is the method to be pursued in the study of general pathology an important consideration? Is it absolutely necessary, for example, in our inquiries, that prognosis be considered before diagnosis, or the causes before the seat of disease? We think not; but are

yet of the opinion that there are certain points in the history of diseases, which, before others, naturally claim our first attention. The definition of disease, is the first subject which presents itself; the study of the progress of diseases should not precede the exposition of the symptoms, and the causes more properly come before than after the latter; the diagnostic and prognostic signs should follow the symptoms, and the consideration of the treatment come after the signs. Thus among the various subjects embraced by general pathology, there are those whose relative position is to a certain extent defined, while there are others which may be considered with equal propriety at different periods during the investigation.

In the arrangement of the subjects which constitute general pathology, it seems to us important that some method be adopted, which shall be equally applicable to the study of particular diseases. This method would thus become more strongly impressed upon the mind. It is moreover well known that a uniform method powerfully assists the memory, accustoming the mind to a proper arrangement of its ideas, and the classification of the new truths which are daily presented.

The following is the order we have adopted in the exposition of general pathology.

We shall first consider the definition of disease in general, and point out the rules which should guide us in the definition of diseases respectively. After some considerations on the *nomenclature*, *etymology* and *synonymy*, we shall speak of the *seat* of diseases, their *causes*, *precursory phenomena*, *symptoms*, *progress*, *duration* and various *terminations*. We shall thus be led to the examination of the doctrine of crises and critical days. *Convalescence*, the *consecutive phenomena*, *relapse*, *kinds*, *varieties* and *complications of diseases*, *diagnosis* and *prognosis*, will be generally considered. We shall also devote a chapter to the *examination* and *appearances* of bodies after death; and having touched upon the fundamental rules of *treatment*, we shall conclude by offering a few remarks on the *nature* and *classification* of diseases. — O.

CHAPTER II.

DEFINITION OF DISEASE IN GENERAL, AND OF DISEASES RESPECTIVELY.

THERE are two kinds of definition, one being an accurate statement of the nature of a thing, the other a rapid enumeration of its principal characteristics. In either case, the definition to be correct, should present so clear an idea of the object defined, as to render it always recognizable, and easily distinguishable from all others.

Of these two kinds of definition, the first, which acquaints us with the nature of things, would be preferable to the second, were it as certain and general in its application; but there is a vast number of objects whose nature is unknown to us; and though there be those in which it seems to be understood, this knowledge is rarely so well established, as to serve as a basis whereon to found a correct definition. The second mode of definition consists rather in a brief description, than a definition of the object. It rests on phenomena appreciable to our senses, without reference to the nature of the object itself, which is beyond their reach, and the knowledge of which can only be attained by abstract reasoning. It has been justly remarked by M. Dumas that abstractions mislead the mind, while truth is conveyed to us through the medium of our senses. The history of all sciences, and particularly that of medicine, proves the truth of this assertion. During the period when the first mode of definition was employed, the progress of science was retrograde; when, on the contrary, the description came to be substituted for the definition, its advance was constant.

I. Disease, as is well known, is that state opposed to health, a word the significance of which is familiar to every one. But to render an accurate definition is still no less difficult, as is evident from the number and variety of those which have been already proposed. Many physicians have attempted its definition by referring to its nature, or its ultimate cause. *Alemæon de Crotone* made it to consist in a derangement of the forces, the concurrence and harmonious action of which result in health; *Plato*, in his definition, for forces, substituted elements, and *Asclepiades* replaced the elements of *Plato* by indivisible corpuscles; *Sylvius* viewed disease as a reaction of salts; *Brown*, a lesion of excitability; *Ritter*, a galvanic change; *Baumes*, a change in the proportion of caloric, oxygen, hydrogen, nitrogen and phosphorus; and *Broussais*, an effect of irritation, &c. Most of the other definitions of disease, founded upon its nature, are either comprised in those above cited, or are so obscure, as to require a long explanation to render them intelligible; they have consequently been omitted in a work strictly elementary, and in which such a display of erudition would be out of place. Before taking leave of this subject, however, due consideration should be given to the definition of disease proposed by Sydenham.

This writer, with all his natural sagacity and soundness of judgment, attempted to define disease, according to its peculiar nature. "*Dictat ratio, si quid ego hic judico*"* modestly says this eminent physician, "*morbum quantum libet ejus causæ humano corpori adversantur, nihil esse aliud quam naturæ conamen materiæ morbificæ exterminationem, in ægri salutem, omni ope molientis.*" This definition, although approximating in some respects to the present language of the science, is nearly as defec-

* Sydenham, *de morbis acutis in genere*, page 19.

tive as those which preceded it, presenting but a vague idea of an indeterminate effort of nature, a power of which we are totally ignorant. Besides, the effort exerted by nature to destroy the morbid cause, would rather constitute the remedy, than the disease. Finally, this reaction against the morbid cause does not always exist, and consequently Sydenham's definition, were it correct in other respects, would fail in this, since a definition should apply to all cases.

The nature of disease being unknown, it becomes necessary to seek other grounds upon which to found its definition. This necessity has been recognized by pathologists of every age.

Disease has by some authors been defined to be a derangement of the functions. To this it has been objected that mere functional disturbance is insufficient to constitute disease, and that there are certain phenomena, which are capable of giving rise to the former, without producing the latter. A state of general disturbance ordinarily accompanies the catamenial flow in females, not however, amounting to disease. Parturition is attended with violent pains, is followed by a flow of blood, together with a feeling of weariness and debility, yet without the existence of disease. A violent passion, as anger or fright, may give rise to extreme functional disturbance, without however inducing disease. In old age, the exercise of the functions no longer takes place with the same regularity; the organs of generation become gradually unfitted for reproduction, the functions of relation become by degrees enfeebled, the intellectual faculties become clouded, the sensations blunted, and the step unsteady. The organs of individual life themselves become subsequently affected, yet without the existence of disease. In the person who has been deprived in any way of an eye or an arm, there is not a regular exercise of all the functions, yet it is manifest that disease does not exist. A sensation of uneasiness in any part, an acute but momentary pain, a transient spasm, or involuntary movement, are instances of functional derangement, but cannot be considered as diseases.

Disturbance of the functions alone is then insufficient to constitute disease, since even a considerable irregularity in their performance is not necessarily incompatible with health. To define health therefore to be that state in which all the functions are performed with harmony and regularity, is incorrect. There is, as has been said, an individual health which is influenced by a variety of circumstances. This has been remarked by many physicians, and has led them to modify the definition under consideration. Some have said, that functional derangement to constitute disease must be the result of morbid causes.* By others, the epithet *præternatural* has been prefixed to signify that such functional disturbance must be a deviation from the ordinary course of nature.† This defi-

* Ludwig, *Patholog. Instit.*, page 6.

† The Latin adjective *præternaturalis* has commonly been construed by the word *unnatural*; this is far from its true sense: it expresses a deviation from, not an opposition to, the ordinary course of nature.

inition thus modified, is more accurate, but is still susceptible of improvement. Every species of functional derangement, in which there is a greater or less deviation from the usual order of nature, constitutes a disease; but disease may exist independent of functional disorder. Hernia, for example, is a disease, but not always accompanied by disturbance of the functions. Tubercular degeneration, a very serious disease, may occur in several glands, and even in a portion of an important viscus, as the lungs, without giving rise to apparent disturbance of the health. It has been maintained by some authors, that an anatomical lesion, which is not followed by apparent functional disorder should not be considered as a disease; that the disease can only be said to exist from the moment when certain phenomena of reaction render it evident. Disease, according to them, and M. Littré adopts this definition,† is “*a vital reaction, either local or general, immediate or mediate, against some obstruction, disorder or lesion.*” According to this definition, a change of structure, however considerable, in those cases of aneurism at the root of the aorta, which sometimes become far advanced without causing apparent disturbance of the health, would not become a disease till complete perforation of the vessel should take place; while the same lesion, occurring in another part of the same vessel, and causing either compression upon a neighboring organ, or giving rise to perceptible pulsations through the thoracic walls, would constitute a disease almost from its commencement. In a fracture, the disease would consist rather in the reaction against the lesion, that is, in the pain, difficulty of movement, and inflammation which is developed at the surface of the fragments and in the contiguous parts, than in the anatomical lesion itself. These two examples taken from the most familiar diseases, show the incorrectness of this definition, which has been before pointed out, in considering that proposed by Sydenham, within which it is comprised.

It follows from these considerations, that it is impossible to render a satisfactory definition of disease, without including changes of structure, whether accompanied or not by functional disturbance.

Structural changes being in most diseases the principal, and functional disorders occurring, as secondary phenomena, it has been thought by some physicians that all diseases are necessarily connected with a *material organic lesion*, and that disease, considered abstractly, should be defined an *alteration occurring in the structure of the body*.

It should be recollected that in a great number of diseases, the existence of such an alteration is manifest, and is of the highest value in the appreciation, as well as in the definition of disease. It may be also remarked, that the number of affections, in which these changes are found to exist, is becoming more considerable in proportion to the advance of medical science, and will ultimate-

† *Dictionnaire de Médecine, ou Répertoire général*, vol. xviii., article, *Maladie*.

ly become indefinitely increased; in addition to the discoveries daily made by pathological anatomists of lesion in the solid parts, previously unnoticed, chemistry is leading to similar results, by bringing to light important alterations in the fluids which enter into the composition of the human body, as the bile, blood, urine, &c. The changes observed in the quantity and consistence of certain fluids, and particularly the blood (plethora, anemia); the excessive accumulation of gas, in parts which naturally contain it, its formation in parts to which it is foreign, have added to the list of diseases, in which a material alteration exists. These lesions of the liquid and gaseous fluids, which form a part of the human body, deserve to be placed with those of the solid parts; and should, in the absence of lesions occurring in the latter, be comprehended, at least by inference in the definition of the disease.

By thus observing the progress of the science, it may be very naturally inferred that, in proportion as our means of chemical analysis and observation become more perfect, those diseases in which hitherto no material lesion has been discoverable, will be gradually added to those whose primitive lesion is already known, and disease may then be defined to be an alteration occurring in the structure of organs. But in medicine, more perhaps than in any other science, we must be guided by facts; and as it often happens that this alteration escapes all our means of investigation, and the functional disturbance is alone appreciable, and consequently that alone which, in the present state of our knowledge, indicates and constitutes the disease, it becomes necessary, in attempting its definition, to characterize it by reference both to material lesions and to functional derangement.

In the former editions of this work, we defined disease to be a perceptible change in the position or structure of parts, or in the exercise of one or many functions, relatively to the habitual health of the individual.

We have thought proper, for the sake of brevity, to strike out the clause relating to the changes of position of organs, since such a change cannot be effected, unless there be also structural alteration of the parts: a hernia can only follow a structural change in the parietes of the splanchnic cavities; dislocation can only take place after rupture, or some other alteration in the parts, of which the articulation is composed. We would likewise omit the last clause of the definition, *relatively to the habitual health of the individual*, as good sense alone indicates this condition, which moreover would be more appropriately placed among the considerations which precede the definition, where it is presented with its necessary developments. We have also employed another expression in place of the word *structure*, which does not so well apply, in common phraseology, to the changes which occur in the composition and quantity of the fluids, or to alterations in the volume of the solid parts, when at the same time unaccompanied by manifest alteration of the tissues. It being impossible to define

disease according to its nature, and to obtain a clear idea of it except from what is revealed to us by its phenomena, we give the following definition: a perceptible disorder occurring, either in the material disposition of the parts composing the living body, or in the exercise of its functions.*

Some authors have endeavored to create a distinction between affection and disease, expressions generally employed as synonymous. It has been thought by some that the word *affection* is more appropriately applied to surgical cases, while those strictly medical, would be better indicated by the word *disease*. Others have maintained that *disease* consists in structural lesion, and *affection* in the sensible phenomena arising from such lesion.

Sprengel, who presents this distinction, thinks it should serve as a base for the division of pathology into general and special; the former treating of diseases, the latter of affections. In the sense in which Sprengel employs these two expressions, both belong equally to general, and descriptive or special pathology. This distinction between affection and disease ought then to be rejected, as contrary to common acceptation, and as rendering the language obscure without elucidating the subject. The words *affection* and *disease* therefore, in medical phraseology, are used synonymously, although the latter, considered in its most general sense, admits of a different signification.

II. Having defined disease in general according to the principles previously established, we shall proceed to consider the mode of defining diseases respectively. These considerations belong to general pathology, inasmuch as they apply to all diseases.

To obtain a correct definition of each particular disease is of far more importance, than the attainment of a clear idea of disease in general.

Being ignorant of the nature of diseases respectively, as well as of disease in general, it is necessary that we define them also according to their sensible phenomena.

It has been recently advanced, that a disease can only be defined by determining which is the organ affected and the character of that affection; but this kind of definition which can only apply to a limited number of diseases, is not strictly a definition. To say that pleurisy is an inflammation of the pleura; tabes mesenterica, a tubercular degeneration of the mesenteric glands; ascites, an effusion of serum into the peritoneum; epistaxis, a hæmorrhage from the pituitary membrane; is to give a signification of the word, and not a definition of the disease. Another and more serious inconvenience connected with this kind of definition, is the uncertainty in respect to the seat of certain diseases, and the conflicting opinions among physicians on this point. How various, for example,

* This definition appears to us more accurate than any other, although defective in some respects; this imperfection is, perhaps, inherent in the subject under consideration. Health and disease are often confounded. How is it possible to define with strict accuracy things not always distinct?

would have been the definitions of intermittent fever, whose seat has been placed in the liver, spleen, stomach, intestines, nervous system, skin, vena porta, lymphatic vessels of the mesentery, and to what confusion would these contradictory statements have given rise! It is necessary then, in order that the definition be always intelligible, to define these affections according to their phenomena. There are also cases, in which the manifest cause of diseases becomes an accessory element in their definition: contusions, wounds, lead colic, asphyxia, syphilis, variola, &c., cannot be accurately defined, unless the cause which produced them be indicated.

In general, in order to the correct definition of a disease, it is necessary to collect the greatest possible number of detailed cases, relating to it; to compare them with each other, so as to isolate those phenomena which are constant, from those which are simply accidental.

The phenomena which are found to occur in all the cases, or at least in the majority, form the characteristic features of the disease; their brief enumeration will present an outline of the latter, constituting its definition.

Some diseases appear with such different degrees of intensity, that it would be impossible to include in a common description these various forms of the same affection: cerebral hæmorrhage, for example, gives rise to phenomena so various, according to the size of the coagulum, that it is indispensable, in order to give a correct idea of this disease, to present a descriptive definition of its principal forms, as in natural history, in which the representation of a plant or animal is given, in its principal phases of existence, and in its various proportions. The remark of Grimaud, that the thorough knowledge of a disease is only to be obtained, by studying it at the age, and in the sex, temperament and climate, which observation has shown to be congenial with it, is incorrect; "for," says he, "every disease,* like every natural being, appears in its true light, and enjoys the whole plenitude of its existence, only when formed and developed under a concurrence of circumstances, which are analogous to it, and equally tend to favor its production." The physician, whose knowledge of a disease only extends to its severest form, can have but an imperfect idea of it, being acquainted only with its exceptional form. It should be studied, on the contrary, in all its varieties, and if there be any which deserve particular attention, it should first be those of most frequent occurrence, and afterwards those whose characteristics are least apparent, the former on account of their greater utility, the latter, because of their more difficult diagnosis. But, we repeat it, the definition of a disease is only correct, so far as it comprehends all the forms which the latter is capable of presenting. — O.

* Grimaud. *Cours de Fièvres*, vol. i., p. 2.

CHAPTER III.

NOMENCLATURE OF DISEASES.—SYNONYMY.—ETYMOLOGY.

I. *Nomenclature.* There is perhaps no science, the nomenclature of which is so defective, as that of pathology. This is doubtless, in part, attributable to the very gradual progress made in the knowledge of diseases. If, like chemistry, the science of pathology had made a sudden and rapid advance, the old terms would have been replaced by others formed on more regular bases. But the case has been far otherwise, and nothing can be more preposterous than the collection of names by which diseases have been designated. Some have been named from their known or supposed seat, as *pleuritis* and *hypochondriasis*; or from their causes, as *colds*, &c.; others from the places and seasons in which they appear, as the *camp*, *harvest* and *autumnal*, fevers, (*Grant*;) from the country where they originated, as the *typhus of America*; from the people who transmitted them, as the *French disease*, (a term applied by the Italians to syphilis;) from the animal which communicates it, as *vaccinia*; others, from one of the principal symptoms, as *hydrophobia*, *chorea*, &c. In eruptive diseases, the color of the skin has, in many instances, suggested the name by which they are designated; *rubeola* and *scarlatina* are examples. The word *variola* seems to have had the same origin, and to signify that diversity of color which the skin presents, when its surface is covered with white pustules, or yellowish or brownish crusts, surrounded by a red and sometimes brown areola, and separated by spaces in which the natural color remains unchanged. The particular form of certain eruptions, the manner in which they are disposed upon the skin, their appearance during the *night*, have led to the adoption of names indicating these different circumstances, as *miliaria*, *herpes zoster*, *epinectis*; other affections have received names relating to their progress or duration, as *intermittent*, *continued*, and *remittent fevers*. The insidious form of some diseases has caused the term malignant to be applied to them. There are others which have been designated, from a sort of resemblance to certain products of human industry, or some object of natural history, as *tympanitis*, *clavus*, *cancer*, *polypus*, *talpa*, and *elephantiasis*. Others have received names indicative of their supposed nature, as *putrid* and *bilious fevers*; and again, indicative of the kind of organic alteration which constitutes the disease, as *tubercle*, *melanosis*, *encephaloid disease*; others have been named from the physician who first described them, as *Potts' disease*, *Bright's disease*. Besides these principal terms, some epithet indicating its degree of severity, form, termination or mobility, has been added to the name of the disease. Examples of this, are the *variola benign-*

na, apoplexia *fulminans*, tinca *favosa*, angina *gangranosa*, febris *ephemera*, erysipelas *erraticum*.

It is evident from this brief survey, that no rule has been observed in the selection of the names under which diseases have been described, and that incongruity prevails throughout pathological nomenclature. But another and more serious inconvenience which it presents, is, that many terms are false, and consequently liable to lead to error; such are those based on the supposed seat of the disease, and upon its intimate nature. In some cases, the error is still more palpable, affecting some point relative to the origin of the disease, or some one of its more apparent phenomena. Thus, the *disease of Siam*, originated in America; the *hepatic flux* does not generally come from the liver, and the *fluor albus* may be of other colors, &c.

The defects of such a nomenclature are too striking, not to have led many physicians to attempt their correction; but it should be remarked, that these corrections have in nearly every case been partial, and that M. Piorry has been the first to propose a complete system of nomenclature for all diseases, established on uniform bases. These partial corrections, failing to produce a proper regularity, have proved rather injurious than useful. In some cases, more appropriate names have been substituted for those which were vague or erroneous, but the latter have not been totally abandoned; so that many diseases have received a variety of names, with which it is necessary to become familiar; no less than twenty have been applied to yellow fever. The effect of these numerous pathological terms, has been to increase the number of words, without aiding in the elicitation of truth.

Another, and still more serious, inconvenience results from these partial corrections; some authors, not content with adding new names to the old, have transferred the same term from one disease to another, under the pretext that it was less appropriate to that to which it had been previously applied, than to the one which it was henceforth to represent. The troublesome results of these pretended improvements are easily discernible; confusion in pathological language has been the necessary consequence.

It will be perhaps asked, if, in the present state of the science, a new nomenclature could with advantage be established, and on what basis. When we consider the imperfections and incongruity of nomenclature, as it now exists, we become convinced of the importance of substituting a methodical nomenclature, which shall indicate the characteristic features of each disease, and by which we shall be enabled to establish their relations with each other. But if it be also considered, how much the difficulties connected with the study of the science become increased by such a multiplicity of names, and that, in the present state of our knowledge, it is impossible to present any system of nomenclature, which shall be satisfactory to all, as the attempts of M. Piorry sufficiently prove; and, lastly, if we regard the apparent contradictions to which new terms give rise, and the unfavorable inferences of the public with respect

to the certainty of medicine, we shall be led to conclude that the advantages of a new nomenclature would be more than counterbalanced by the inseparable inconveniences connected with it. "*Si nunc imponenda essent nomina,*" says Morgagni,* "*non dubito quin plura excogitari possint meliora et cum vero magis congruentia; sed proestat, opinor, verum postea animadversum docere, vetera autem et usitata nomina retinere.*"

There are some circumstances, however, in which it becomes necessary to add to pathological nomenclature; as upon the discovery of an affection not before described, and also when different diseases have been confounded under the same name. In both cases, it is indispensably necessary, even the enemies of neologism will admit, to seek a new name for the disease just discovered or pointed out.

II. *Synonymy.* The same disease having, in some instances, received a variety of names, and the same name having been applied to many diseases by different authors, the study of the various names of diseases, with their different significations, has become also indispensable. This is, as it were, an artificial branch which man has added to pathology, without any real profit, though not without necessity. Synonymy of diseases has consequently become a highly important point in their history, rendering their study more complicated, an irremediable inconvenience, but enabling us to avoid much confusion.

III. The *Etymology* of diseases is one of the least interesting points in pathology. It is, however, like many other things, a knowledge of which is of little utility, but ignorance of which would be attended with inconvenience. No one doubts that a physician may skilfully treat a disease, without being acquainted with the origin of its name; but it is equally certain, that it would be embarrassing, and even injurious for him to appear ignorant in the presence of some persons, of the etymology of a word which he daily employs. An acquaintance with the exact value of the terms in common use, is moreover convenient to the physician; medical phraseology would, otherwise, be to him unintelligible. Most of the names which have been applied to diseases, are of Greek and Latin origin; and as the study of these two languages should always precede that of medicine, it is rarely necessary for the physician to seek the etymology of the terms of which he makes use.

The etymology of the various terms used in pathology but imperfectly indicates the meaning which should be attached to them. It rarely gives an accurate, and often presents a totally incorrect idea of the disease. Thus the words *phlegmon*, and *phlegmasiæ*, from *φλεγω*, 'I burn,' merely give the idea of heat, which is but one of the symptoms of the disease; the word *peripneumony*, from *περι*, 'around,' and *πνευμονη*, 'lung,' indicates an affection seated around the lungs, whereas it consists in inflammation of this viscus itself,

* Morgagni, Epist. xvi. 14.

and not of the surrounding parts. Thus, etymology, in the former case, presents an imperfect, in the latter, an erroneous, idea of the disease.* — O.

CHAPTER IV.

SEAT OF DISEASES.

It may be remarked generally, that all the constituent parts of the human body are susceptible of some change, and consequently may become affected with diseases of greater or less severity. The susceptibility to the influence of the various morbid causes, varies in different organs; the skin and mucous membranes are of all tissues, those in which diseases are most frequently observed. The organs which are deeply seated, and which have no direct communication with external objects, are less prone than all others to the action of disease.

It is not always easy to determine the seat of diseases, and the history of medicine shows how great has been the diversity of opinion on this point. During the reign of humorism, the primitive seat of most diseases was supposed to be in some one of the fluids which enter into the organization of the human body. The Solidists, who came afterwards, supposed the humors to be purely passive in the phenomena of life, and considered the solids to be the seat of all diseases. Time has dealt justly with these erroneous opinions, and observation has shown that the exclusive claims of both these systems are alike inadmissible.

It should be recollected that many diseases have a complex seat, primarily affecting the solid parts, and afterwards extending to the fluids of the body, or *vice versa*. The first stage of phlebitis presents an example of a disease at first confined to a single tissue, but soon followed by a secretion of pus from the suffering part; this morbid product being carried along by the circulatory movement, is mixed with the blood, which becomes altered, and, by its effect upon other organs, produces phlegmasiæ and suppurations. In variola, on the contrary, and in the other contagious eruptive

* Although the etymology of diseases is generally of slight importance, it is not in many cases devoid of interest. The names which have been given to diseases are often connected with the history of medicine, and the theories to which it has given rise; such are the terms *humoral fever*, *nervous fever*. Etymology may also give rise to conjectures upon some of the circumstances relating to the particular history of a disease, &c. The term *morbilli*, for example, by which rubeola has been designated, would lead us to suppose that there appeared, simultaneously with it, another and more severe affection, bearing resemblance to it, which was called *morbus*, a name always given to epidemic diseases. This circumstance would add weight to the opinion generally entertained, that rubeola, which originated in the same country with variola, first appeared at about the same period.

fevers, in which the blood appears to be the primary seat of the disease, the eruption makes its appearance upon the skin and mucous membranes, a few days after this alteration has taken place.

There are some diseases which affect nearly all the tissues of the economy, as, inflammation, cancer, tubercles, and syphilis. Others are observed in but a few; dropsy, for example, is peculiar to the membranes which line the interior of cavities, and to the cellular tissue; spontaneous hæmorrhage rarely occurs except from the mucous membranes. Hæmorrhage may, however, take place in other parts, and dropsy may be formed, by means of accidental cysts, in parts naturally protected from it by their structure. There are also other diseases, which appear to be constantly and exclusively confined to the same anatomical element, wherever this be; this is probably the case in rheumatism and gout, which are peculiar to the muscular and fibrous tissues.

Many diseases have a fixed seat, that is, they become developed and terminate in the same part where they originally appeared; others, on the contrary, successively invade the neighboring parts, as certain phagedenic ulcers, cancer, erysipelas, and perhaps most of the phlegmasiæ, *called* spontaneous. There are others whose seat, which is essentially vague and moveable, is constantly varying, as is observed in rheumatism and gout, the mobility of which affections constitutes one of their most essential characteristics. There are also certain nervous affections, which successively appear in parts remote from each other, and hæmorrhages are equally liable to change their seat.

There are many diseases which affect but a portion of the economy; there are others, which appear simultaneously in parts more or less remote from each other, exhibiting the same form and characteristics. The former have but a single seat, the latter are disseminated, or have a multiple seat. To the first belong the visceral and membranous phlegmasiæ, as pneumonia or pericarditis; to the second, urticaria, variola, rubeola, the syphilitic eruptions, *morbus maculosus*, &c. These latter affections, to which we have applied the term *disseminated*, deserve particular attention, from the conditions under which they are developed. These multiple lesions are indeed almost always *secondary*, and the physician may in most cases recognize the affection which gave rise to them, and to which the treatment should be directed.

The organs which exist *in pairs* are often simultaneously affected with the same disease. It is rare to see spontaneous ophthalmia confined to one of the conjunctivæ, or bronchitis or emphysema affecting but one lung. There are certain chronic exanthemata which appear simultaneously in both armpits, in the two groins, and in corresponding parts of the same limbs. In rheumatism, corresponding articulations become generally successively affected. The same law is observed in regard to the deep seated organs. It has been clearly shown by M. Bizot, that the numerous changes which take place in the arteries, are almost always affected simultaneously in the symmetrical vessels, and at corresponding

points.* There are, however, some exceptions to this law; the two testicles, or the mammæ, for example, which often become singly affected with inflammation or carcinomatous disease, are rarely the seat of either of these affections simultaneously.

It has been long observed that the age has a marked influence upon the seat of diseases. During infancy the head is the seat of numerous affections; hydrocephalus, tubercular meningitis, the various eruptions of the hairy scalp, excoriations of the lips, nose and ears, apthæ, gangrene of the mouth, and epistaxis are peculiar to this period; the lightest affections are accompanied with delirium, the submaxillary glands are often engorged, and the larynx is the seat of very serious diseases; it is at this period that croup is most commonly observed. At puberty and during the period of youth, affections of the chest, as inflammations of the pleura and lungs, hæmoptysis, and bronchitis, become more frequent; it is then that the first signs of cardiac disease often manifest themselves, and so common is the occurrence of phthisis pulmonalis at this period, that it was for a long time supposed never to appear except between the ages of fifteen and thirty. While thoracic disease is more frequent during the period of youth, that of adult age is more prone to diseases of the abdomen; it is at this period that most organic affections of the abdominal viscera become developed; diseases of the stomach, intestines, ovaries, testicles, liver, bladder and uterus rarely occur before this time. The hæmoptysis of youth, which succeeds the epistaxis of childhood, is followed in adult age by the hæmorrhoidal flux, which is as peculiar to this period, as the others to the preceding. Lastly, in old age, while the abdomen continues the seat of various diseases, those of the urinary organs become more frequent, and the head again becomes prone to morbid action; dementia, paralysis, effusion of blood into the brain, softening of its substance, deafness, cataract, &c., are diseases as common during this, as they are rare at other periods of life.

To this observation respecting the frequency of diseases of the head, chest and abdomen at particular periods of life, although generally true, there are numerous exceptions. Without referring to the diseases produced by mechanical causes, whose seat is determined by external circumstances, we often see children affected with pulmonary catarrh, phthisis, and various forms of enteritis. Scrofulous enlargement of the mesenteric glands, and intestinal worms, are of more frequent occurrence during childhood than at other periods; mania, whose seat appears to be in the brain, is more common in youth and adult age; simple meningitis occurs at all periods of life, and pneumonia is one of the acute diseases most frequently observed in old age. But however numerous the exceptions, they are insufficient to invalidate the general rule.

It has been stated that the seasons, as well as the age, exert

* *Memoires de la Soc. Med. d'Observation.* Paris, 1836, t. 1, p. 399.

a marked influence upon the seat of diseases; that in winter, cerebral diseases prevail; in spring, those of the chest; while abdominal affections are more prevalent in summer and autumn. This assertion does not so generally apply as the preceding, although not without foundation, particularly if it be considered with exclusive reference to acute diseases.

Such are the general points of view, in which the seat of diseases may be considered, the difficulties and modes of determining which, will be particularly considered in the chapter on diagnosis. — O.

CHAPTER V.

ETIOLOGY, OR THE CAUSES OF DISEASE.*

THE most general signification of Etiology in all the sciences, is the study of *causes*; in medicine, its object is the knowledge of *morbific causes*.

Under the title morbidic causes, is included every thing which produces disease, and all that contributes to its development.

The causes of disease are everywhere present, both around and within us. The things most necessary to our existence, as the air we breathe, the food and fluids which restore our daily loss of substance, the products of human industry by which life is rendered more comfortable and happy, themselves give rise to the ills with which we are afflicted.

The different organs, which united, constitute the economy, and which are designed for the preservation of the entire system, of which they form part, may also, in certain circumstances, disturb its harmony; the muscles, whose use is to transport us from one place to another, may cause displacement and even fracture of the bones; the teeth, the eye-lashes, the nails, by their irregular development, sometimes occasion diseases of a more or less serious nature; gestation, and especially the expulsion of the fœtus, become under certain conditions the sources of danger and death. When we thus behold, within the system and without, the things most indispensable to human life and to the preservation of the species, become in some circumstances the causes of the maladies by which we are afflicted, we are tempted to admit with *Testa*, that there is not, properly speaking, any morbidic cause, nothing in itself injurious: "*Nihil propriè morbificum, nihil noxium naturâ suâ.*" But this assertion, although true in respect to the greater number of causes which disturb the health, becomes the opposite, when, reviewing all the causes of disease, we come to

* *Αίτια*, cause; *λόγος*, narration.

the contagious principles, which are certainly, in themselves and despite the abuse that may be made of them, morbid agents.

The causes of disease being very numerous and varied, the necessity for a division of them has always been experienced: they have been divided into *external*, or those which surround the individual; *internal*, existing within him; *principal*, or those which act an important part in developing diseases; *accessory*, which exert but little influence in their production; *remote*, which prepare or determine the hidden alteration constituting the essence or *proximate* cause of the disease; *predisposing*, which gradually modify the economy and dispose to various affections; *occasional*, which provoke the development of such affections.

The terms *physical* and *chemical*, have been applied to those causes which act in accordance with the laws of physics and chemistry, and which would affect the dead equally with the living body: such are instruments capable of inflicting wounds, caustic substances, etc.; the term *physiological* is applied to those which need the co-operation of a vital reaction in the organ which receives their impressions; *local*, to those whose action affects but a portion of the economy; *general*, to those which extend their influence over all; *negative*, to those which consist in the abstraction of conditions necessary to health; and the opposite, *positive*, to those which act by their own power in the production of diseases. *Material* and *immaterial* causes have been admitted, according as they are or are not recognized by our senses. Finally, as there is a certain number of diseases which occur without appreciable cause, concealed or occult causes have necessarily been admitted, and these have been ascribed by many authors to certain inappreciable qualities of the atmosphere, to which the development of epidemics may be attributed. There are serious inconveniences attending each of these divisions. The proximate cause, which is nothing else than the very essence of the disease and the peculiar modification of the organism which constitutes it, cannot be reckoned among the causes which produce it. Among the occasional causes, circumstances entirely dissimilar are enumerated: the impression of cold, for instance, which at one time develops pneumonia, at another, occasions anasarca, and which most frequently is productive of nothing morbid, is placed in the same category with wounding instruments and poisons, which always produce definite effects upon the system. It is unnecessary to insist upon the imperfection of each of these divisions; neither of them possesses the advantage of uniting those causes which have an analogous action; and yet it is this very circumstance which should serve as a foundation for the most natural division of morbid causes.

Among these causes there are those which are constantly followed by the same diseases; for them we reserve the name *determining*. Others, whose action is often uncertain and always obscure, may be subdivided into two series. In the first, we place

whatever serves, by gradually modifying the economy, to prepare it for any particular affection, and everything constituting the aptitude for being so affected : these are *predisposing* causes.

In the second series we rank those whose action, usually transient, only hastens the development of a disease, to which the patient was predisposed : to the latter we give the name *occasional* or *exciting* causes.

Thus we admit three orders of morbid causes, which we distinguish by the appellations determining, predisposing and occasional. We shall rapidly review the chief causes which belong to each of these three divisions, and shall afterwards offer some general considerations upon their mode of action in the production of disease.

ARTICLE FIRST.

Determining Causes.

DETERMINING causes, which constantly give rise to the same affection, if we except certain conditions more or less well known, exhibit in almost every instance, either in themselves or in the disease which they produce, some peculiarity. The hot body which burns, the cold which freezes, the gases which poison or cause asphyxia, the body which inflicts a wound, the poison which narcotizes or causes convulsions, are certainly *special* causes, in like manner as the diseases which they induce are themselves unlike all others. This it is which led us in the former editions of this work, to class these morbid agents among the specific causes, and to use synonymously the terms *specific* and *determining* causes.

Notwithstanding, we now think that a more strict signification should be given to these words, and one more in accordance with general usage : by specific causes, then, will be understood those which produce specific diseases, and by specific diseases, those which cannot be developed except *by one and the same cause*, as syphilis, rabies, variola. Those causes whose action is equally direct and constant, but which give rise to diseases which other causes may also produce, will be designated common determining causes ; burns and wounds, for instance, may be produced by various agents. We may add, that the greater part of the common determining causes act by virtue of physical or chemical laws, and that their action can be explained by these laws. Specific causes, on the contrary, in their mode of action, are inexplicable, either by means of physics or chemistry. Such are the motives which have induced us to divide these two classes of causes and to study them separately.

§ I. *Common determining Causes.* These may be diffused in the atmosphere (*circumfusa*), brought in contact with our bodies, (*applicata*), or introduced into our organs (*ingesta*) ; they may exist within us and depend upon derangement of the evacuations

(*excreta*), of the movements (*acta*) or of the perceptions (*percepta*); they will be pointed out in this order, which is the one most commonly followed in the explanation of hygiene, and which is equally well adapted to the study of morbid causes.

A. *Circumfusa*.* In certain circumstances gases *unfit for respiration* are introduced into the air passages; nitrogen, the protoxide of nitrogen and hydrogen have been *inhaled* by chemists in order to ascertain their effects on the animal economy. They produced a mild asphyxia very different from that caused by the *deleterious* gases. These last are sometimes found accumulated accidentally in certain places where the external air penetrates with difficulty; as in drains, sewers, mines, certain work-shops, factories, and in some thermal establishments. Carbonic acid gas and carburetted hydrogen, which are disengaged by the combustion of charcoal, may become mixed with the air in sufficient quantity to asphyxiate the persons who breathe them. The same is true of the gases which escape from animal matters, particularly excrement in a state of putrefaction, in a closed vault, by which asphyxia is quickly produced. This accident, to which the workmen, who are employed in clearing privies are exposed, is occasioned by a gas long known as sulphuretted hydrogen, and which seems most commonly composed of hydro-sulphuric acid, hydro-sulphate of ammonia and nitrogen. Carbonic acid gas accumulated in the lowest part of certain caverns, (as in the *Grotto del Cane*, for instance) is in that situation several feet in depth; if a man enter, he is above the level of the deleterious gas, but a child would be asphyxiated, like the animals which are introduced for experiment.

Putrid and malignant fevers have at times raged epidemically during the disinterment of a large number of bodies: the town of Saulieu, in 1773, presented a sad example;† and long previously, an epidemic, gangrenous fever had been observed,‡ produced by tainted air after contagious disease among animals, where great numbers of their bodies remained unburied and infected the atmosphere.

Vegetable emanations are occasionally the determining causes of disease. Air charged with the odorous principle of the hyacinth, the lily, the orange blossom, the narcissus, causes headache, nausea, dizziness, and sometimes even fainting, especially in small and warm apartments.

A very high, or exceedingly low temperature of the atmosphere is a determining cause of many affections. Individuals exposed to severe cold have often been observed to die with symptoms which might be ascribed to asphyxia or to strong cerebral congestion;

* Properly speaking, morbid agents, diffused in the atmosphere, act only by their introduction into our organs, and, thus considered, should, perhaps, be ranked with the *ingesta*; but it has not been deemed proper to depart from the classification generally adopted.

† Maret, *Usage d'enterrer les morts dans les eglises*. Dijon, 1775.

‡ *De recondita februm remitt. ac intermitt. natura*.

freezing of a portion of the body is at such a time a yet more frequent occurrence. The grave symptoms caused by a very elevated temperature have also been referred by most physicians to apoplexy or asphyxia; but, from the researches of some authors, and those of J. J. Russel in particular, it seems that the special action of heat is a determination towards the thoracic organs, causing violent congestion, frequently terminating in death.*

A very brilliant light suddenly flashing upon the eye, or an exceedingly loud noise, may produce blindness, or deafness.

A violent discharge of electricity diffused through the air, or collected by apparatus, has caused in some persons sudden death, in others, incurable tremor, stupor, or partial paralysis.

B. Among the *applicata* a great number of *determining* causes exist. Those bodies which inflict bruises, and pointed and cutting instruments, are the most common causes of all the wounds to which man is exposed. Falls, in which the human body strikes with the impetus it has received, against surfaces more or less resistant, give rise to diseases, analogous to those produced by vulnerary agents.

In the same class with these latter must be placed *ligatures*, which, in addition to their hindrance of free circulation, may penetrate into the tissues when strongly drawn, and asphyxiate when applied over the course of the trachea.

Immersion in a liquid has a similar effect by preventing the ingress of air. Incandescent bodies, and boiling liquids placed in contact with our flesh either inflame or cause gangrene, according to their degree of power. Solid or liquid caustics, acids, alkalies and salts, act in an analogous manner; some of these substances, as corrosive sublimate and arsenical preparations, may be absorbed at the surface of the body at the same time that they act locally as caustics; they may likewise be conveyed into the internal organs and give rise to the phenomena of poisoning. In the same series may also be placed the acrid topical agents, whether rubefacient or vesicant, as the flower of mustard, the powder of cantharides, the bark of the *Daphne Mezereum*, etc., etc.

C. *Ingesta*. Substances introduced into the interior of the body, become frequently the determining causes of disease. The poisons belong almost wholly to this class. By *poisons* are understood, according to *Mead*, all those substances which, in minute doses, are capable of producing great changes in living bodies. We prefer, with Mahon, to give the name to those only which are destructive of life.

Formerly, poisons were divided into mineral, vegetable and animal. M. Orfila has, with reason, considered it more convenient to class them according to their mode of action upon the economy, rather than after the particular natural kingdom to which they

* Encycl. des. Sciences Medicales p. 235.

belong. Consequently, he has divided them into four classes, according to their properties, viz., *irritating*, *narcotic*, *narcotico-acrid* and *septic*. Irritating, corrosive, escharotic or acrid poisons, according to their strength, simply inflame or completely disorganize the part to which they are applied. *Narcotic* poisons, such as opium, the solanaceæ, etc., act in an entirely different manner: their operation is particularly upon the brain, whose functions they disorder or suspend, and they have but little effect upon the organs with which they are in immediate contact. *Narcotico-acrid* poisons, such as the poisonous mushrooms, present the above two modes of action united. Finally, *septic* poisons, as the flesh of animals who have died of pestilential diseases, putrifying animal matters, and certain products of morbid secretion, bring on grave disease of an adynamic or ataxic form, often complicated with gangrene, and most usually terminating fatally. Ergot, which produces gangrene of the tissues, must be classed, for this reason, with the septic, rather than with the narcotico-acrid poisons.

D. There are but few determining causes among the *excreta*, the *gesta* or the *percepta*. A very abundant natural hæmorrhage, particularly if menstrual, may bring on anæmia. A strong muscular contraction may rupture a tendon, or break a bone: it is often the determining cause of hernia, and sometimes of dislocation. Very powerful moral affections, as disappointed love, or nostalgia in adults, and chagrin in children, are sometimes the determining causes of a species of hectic fever. A deep-seated passion is commonly the determining cause of melancholy. Despair, terror, and immoderate joy, have, in some cases, caused sudden death. There are some diseases which may become the determining cause of certain others. Thus, severe parotiditis has sometimes produced asphyxia; a fracture or a dislocation, the formation of enormous abscesses in the cellular tissue; perforation of the stomach, rupture of the gall-bladder, the urinary bladder, the uterus, the erosion of the intestines by ulceration, and of the pleura by softened tubercle, are so many direct causes of peritonitis or of pleurisy almost inevitably fatal.

Retention of fæcal matter in the rectum, has sometimes occasioned all the phenomena of intestinal occlusion, and in some rare cases has caused death, especially in aged patients.

Finally, the presence of certain parasitic animals in the human body, may be added to the above determining causes, as *tænia*, the *oxyuris*, the *ascaris lumbricoides*, *hydatids*, etc. Their existence does not always produce morbid phenomena, but is, in itself, something abnormal as regards the material disposition of the parts. Consequently, it constitutes a disease which will always be the same in its essence, however varied may be its form. It is the same with inanimate foreign bodies, introduced into our organs by the natural passages, or by the medium of a wound; although their presence may occasion no disturbance of the health, we must, nevertheless, class them with the determining causes, be-

because they act in a uniform manner; the point of an instrument or a ball remaining in a wound, or a foreign body in the trachea, evidently belong to this class of causes.

Specific determining Causes. The peculiar character of these, as was mentioned, is the production of diseases, which they alone can cause, and the impossibility of explaining them by physical or chemical laws.

They are subdivided into two distinct series, according to their mode of action: to the first, belong those whose effects are confined to the individual who is exposed to their influence; to the second, those morbid agents, which, like seeds, reproduce themselves in the course of diseases to which they give rise; so that the individual affected by them, propagates them in turn, and may transmit them to other persons; hence arises the necessity of subdividing specific causes into common and contagious.

Common specific Causes. This series consists of certain metallic emanations, some of the poisons, miasmatic exhalations, and the venomous secretions of animals.

Those who work in lead, painters, smelters of metals, those who grind colors or prepare the carbonate and red oxide of lead, etc., are subject to a disease known as lead colic, an affection, which differs sufficiently from all others to which the digestive tube is subject, to be ranked among the specific diseases. The colic caused by copper, on the contrary, closely resembles the inflammation resulting from external causes. Therefore, notwithstanding the similarity between these two kinds of colic, we must refer the action of copper upon the economy, to common determining causes, while the preparations of lead will come under the head of specific causes; in like manner mercury and its compounds belong to this second series, in consequence of their entirely specific influence upon the mucous membrane of the mouth, (*stomatitis, or mercurial salivation.*) Strychnine and brucine, which cause tetanic convulsions, such as no other known substance can produce, may with propriety be classed with the specific morbid agents.

Miasmatic exhalations constitute another group of morbid causes, which reason would induce us to admit, but whose existence even, has not, as yet, been confirmed by physics and chemistry, much less their nature and effects determined. We shall refer them to two classes, according to their origin.

The first spring from the decomposition of dead vegetable and animal matter, in moist or marshy places, and in stagnant water. These are styled *marsh miasmata*, the *effluvia of marshy grounds*: if it is borne in mind that intermittent fevers prevail habitually throughout the regions where the conditions which cause such decomposition exist; that these fevers make their appearance towards the end of summer, when the receding water has exposed its basin, formed chiefly by the remains of decaying substances; if it be remembered that these affections have

always disappeared upon the drying up of the marshes; that they show themselves only momentarily in most of those places where pools of water are accidentally formed; if we notice that they are very frequent and exceedingly grave in the localities nearest to standing water, and become more rare and less severe in proportion as we remove farther from such places; finally, if we regard the influence which the winds in the neighborhood of marshes have upon their development,* we cannot but admit the existence of these miasmata, and the part which they play in the production of intermittent fevers. Our authority for ranking the marsh miasmata among the specific causes, becomes the higher, from the fact that the specific character of the diseases which they produce, is demonstrated by the specific character of their remedy. There cannot be a specific remedy, except for those diseases which recognize one and the same cause.

The other species of miasmatic exhalations is derived from living beings, healthy or otherwise, but chiefly from those diseased, when collected in too large numbers in confined places.

The peculiar developing causes of infectious disease most often exist united, on board vessels, in prisons, camps, hospitals, and besieged cities, and these are the conditions which cause a great number of diseases to rage with the most intensity; they have been described as putrid, malignant and pestilential affections. Almost all of them belong to the different kinds of typhus and to dysentery.

By general agreement, they are deemed to be owing to the alteration of the air by the miasmata, and to the infection of the economy by it when thus vitiated; by *infection* is understood the action exercised by these causes, and the resulting diseases are termed *infectious*.

Venomous secretions must also be classed among the specific causes of disease. These are peculiar to certain species of animals, and serve as their natural means of attack and defence: when deposited by the animal secreting them, in the wounds which it inflicts, they occasion the same sort of affection in every instance. The viper, the wasp, and the bee, in our climate, are the only creatures provided with apparatus fitted for the secretion and deposition of these poisons. In warmer climates, the scorpion and various kinds of serpents possess far more deleterious qualities. Venom differs from *virus* in many respects. The latter, as we shall hereafter see, is only produced accidentally, by diseased individuals; the formation of venom, on the contrary, is continual, and is not connected with any functional disturbance: virus acts slowly, and reproduces itself in those affections to which it gives rise; the effects of venomous secretion are prompt, and not transmitted from the one who suffers by them, to others.

§ II. *Contagious Principles*. There is a certain number of diseases which may be transmitted from the affected individual

* Lancisi, Senac, Alibert.

to healthy persons, who are in communication with him. This transmission of disease arising usually from direct or indirect contact, has been called *contagion*; and the epithet *contagious* is applied to diseases thus transmitted.

We are ignorant of the *modus operandi* of contagion; nevertheless it is probable that it takes place by means of a material agent whose existence cannot be called in question, although it escapes our perceptions: this agent is called *the contagious principle or virus*.

Although not recognized by our senses, the contagious principles have been made the object of special research by some physicians. The following is the opinion of most pathologists upon this point.

The invisible principle which causes contagion, is usually enveloped in a visible substance, as mucus, serous fluid, pus, (either liquid or dried into crusts,) and the matter of cutaneous transpiration. These different substances not being contagious in themselves, it is supposed that they do not become so, in certain cases, except by mixture with this subtle and unattainable matter, which is the agent of the contagion. At all events, it is not impossible that the pus and mucus may become contagious in themselves, by reason of the alteration effected in their essential nature.

However this may be, the following are the chief characteristics of contagious principles:

By means of a constant series of morbid phenomena, they all reproduce principles similar to themselves, and capable of causing the same effects. They may be multiplied *ad infinitum*, by means of this secondary development, so long as they meet with bodies capable of fully receiving their action. Indeed, we doubt the existence of any virus whose contagious properties become extinct after the second transmission, as some have endeavored to prove in regard to rabies; nevertheless, we do not hesitate to admit that some kinds of virus, by continual reproduction, appear to become enfeebled in their action; for example, the syphilitic virus and that of the plague.

Some of these contagious principles destroy, either temporarily or entirely, in the individual who experiences their effects, the susceptibility of being again affected; such are those productive

* Hufeland defines contagion, or the contagious principle, to be a subtle matter which insinuates itself into the living body, and which may there excite a definite form of disease. The marsh miasmata are, according to him, and by the above definition, contagious principles, as well as the variolous and syphilitic virus. He admits two sorts of contagion, the living and the dead. "The first is produced by a living body; it may occur in all those diseases where the humors have acquired a *high degree of putridity*, and when there is a specific change in the state of the secreting organs, as also in that of the humors which they secrete, as in measles, scarlatina, dysentery, etc. The other sort of contagion, is that derived from the exhalations of inanimate bodies; such are the marsh miasmata, the foul air which causes catarrhal fevers, etc.

of typhus, small-pox, scarlatina and measles: others have seemed to increase rather than diminish this liability to renewed attacks: the syphilitic virus is one of these. In other words, some contagious diseases attack the same person only once during life; others, which are the exception, reappear at the end of some years; finally, others occur in those who have before been affected by them, more readily than in those who had previously escaped their effects.

It is supposed that a certain proportion of the contagious principles are produced without cessation during the entire course of the disease, while others only arise during a certain part of it; but this opinion is not yet sufficiently proved.

The different modes of contagion have been likewise the object of particular research; it may be immediate, or communicated by an intermediate body.

Contagion is immediate when its principle is directly transmitted from the person who originates it to the one who receives it and experiences its effects; this immediate transmission may occur in many ways: 1st, by remaining in the sick room when the air is charged with contagious principles, as appears to be the case in the transmission of typhus and perhaps of variola. 2d. By actual contact, as is observed in most diseases of this character. 3d. By still closer contact, as in the transmission of pestilential, vaccine and syphilitic virus, which are inert upon the sound skin, and cannot be communicated except the epidermis has been previously removed or destroyed, or the virus deposited upon a mucous membrane. 4th. Immediate communication, also, may be effected by means of the remains of animals destroyed by the disease which engenders the contagion: it is in this way that the malignant pustule is communicated to those who dress the skins, or handle the wool of such animals, &c.

Mediate contagion arises through the agency of substances which have been in contact with the patient's body, as his clothes, and the various utensils employed about him. It has been remarked that among the substances which most readily receive and transmit contagion, woollen, silk, cotton and linen, hold the first rank; a strong affinity for these materials has been ascribed to the contagious principles, which are retained by them a long while, especially when kept from the air. Those holding communication with the sick may transmit contagion without being themselves affected; and flying insects, alighting in turn upon the patients and upon healthy individuals, have been supposed to carry to the latter the virus which they had drawn from the former.

The circumstances favoring contagion, or the action of contagious principles, have been carefully examined. It is considered highly important that the contagious principle be of recent origin; its power diminishes gradually in the course of time; for instance, it has been proved by numerous experiments, that the pus of variola, after the lapse of a year, becomes less energetic, and at the end of three, is no longer contagious. *Hildenbrand* supposed that the

contagious principle of typhus did not exist beyond three months, because, according to him, no epidemic typhus is reproduced after that lapse of time, without the concurrence of new causes.

Temperature also has a great influence in facilitating the transmission of contagious diseases; *the degree of heat peculiar to the human body* seems most favorable to contagion, and the nearer the atmospheric temperature approaches this standard, the more easily are contagious diseases propagated. The sudden disappearance of pestilential disease when the temperature is below freezing, has led to the supposition that the contagious principle was susceptible of congelation. It has also been thought that these principles might be destroyed or burned, as it were, by extremely elevated temperature; and those physicians who enumerate yellow fever among the contagious diseases, have supported the theory of the decomposition of virus by heat, by the fact of the sudden cessation of that disease in the torrid zone, when the atmospheric heat attains an unusual degree of intensity. M. Bulard has observed the same in regard to the plague of the East. The frequency of typhus in winter and its greater violence at that season, seem to invalidate the assertion that we have lately made, viz., that a temperature approaching that of the human body would be the most favorable for the transmission of contagious diseases. But if we reflect that the number of sick soldiers is much greater during winter campaigns, and that the cold weather renders it indispensable to quarter them in places partially or entirely closed, where in a short time they become crowded, we shall understand that if epidemic typhus is more frequent and destructive in cold and wet seasons, it is not owing to the cold, but to the concurrence of those injurious circumstances which have just been mentioned. Still farther, it has been remarked that dampness, absence of light, and animal emanations favor the transmission of contagious disease.

Besides these general circumstances which assist the action of contagious principles, there is a certain number which are peculiar, and which exercise the same influence; such are youth and adult age, an impressible and delicate constitution, want of food, abstinence from alcoholic drinks in persons who have habitually used them; the weakness accompanying convalescence, fear, discouragement, terror, errors in diet, excessive evacuations, and the state of sleep.

Man is, almost constantly, the source which begets and perpetuates the greater part of the contagious principles with which we are acquainted. There are, however, some which seem not to be spontaneously developed in him, but to be always transmitted by animals; such are rabies, glanders, and the vaccine disease.

Among contagious diseases, or those considered as such, there are several which originated upon this continent, typhus fever and the itch are examples; there are others which have been imported; variola, scarlatina and measles originated apparently in Asia; the

plague, in Asia or Africa; syphilis and yellow fever were probably brought among us from America.*

The primitive formation or *generation* of contagious principles is shrouded in great obscurity. Some physicians think that having been generated at one particular time, they have ever since been reproduced by means of transmission only. This opinion is, however, inadmissible. It is true that the conditions under which many of these principles are developed, are unknown; but still we must allow that they can, and must be, reproduced by a concurrence of causes resembling those which first brought them into being. The history of European typhus, and its reproduction under the action of well known circumstances, exemplify this opinion, and lead us to suppose that there must be some analogy in the development of exotic poisons, as those of the plague, variola and syphilis.

But if, as everything would induce us to think, these different sorts of virus did not originate in Europe, if they were first

* Were not the incompatibility of this assertion with the date of the first appearance of syphilis, in Europe, sufficient to prevent its incorporation into the present work, even in the *slightly* qualified terms used by the author, it would seem that the concurrent testimony of the best authorities of more remote times as well as of our own, would have rendered its insertion impossible. Jourdan, long since, sufficiently disproved the opinion of the American origin of syphilis, and by an elaborate comparison of dates showed the utter impossibility of its having been imported into Europe, according to our author's supposition. But it is unnecessary to repeat his widely known observations, or even the apparently well-founded opinions of many others who date the origin of the disease as far back as the days of Old Testament narration; among these are B. Bell and M. Cazenave, cited by Grisolle in his late work upon Internal Pathology,¹ who himself also, although he considers the question undecided, evidently leans toward the ancient origin of the disease, and mentions a statute of Jeanne the First, Queen of the Sicilies, relative to medical inspection of prostitutes diseased in their genital organs; this was in 1347, — and no author has pretended that the disease was *imported* before the arrival of Columbus and his companions from America in 1493. Oviedo, one of the champions of the importation doctrine, mentions its appearance in America in 1498, which is after its manifestation at the siege of Naples, by Charles VIII., the conquest of which city was effected in 1495. Some have asserted its existence at Paris, in 1494. It is likewise stated to have been "raging" at Rome, and in other parts of Italy in June, 1493, and even supposing the *possibility* of its having been carried to that country by the followers of Columbus, who arrived from America only two months previously to the latter date, is it reasonable to suppose that it could have been *raging* in various parts of the country *so soon*? Besides, the importation by these men in that space of time, is not proved. Hunter, Sprengel, Pearson and Bacot, among others, have lent the powerful influence of their names and arguments against this doctrine. M. Cazenave, of all modern writers, perhaps, uses the strongest language, and furnishes the most irresistible proof in regard to what he considers the "*fable*" of the American origin of syphilis. Some account of his views may be found in the British and Foreign Medical Review, for April, 1817, pp. 346, 347. Why is it not reasonable to suppose that promiscuous copulation in any country and among the *most cleanly* people, might engender disease of the genital organs? But was it *less* likely to occur among the dirty and depraved soldiers of a European army, and the luxurious profligates of the higher classes, than among the inhabitants of America, simple in their habits, and, as it were, only on the borders of civilization? — TRANS.

¹ Path. Int., vol. ii. p. 23. De La Syphilis ou Maladie Vénérienne.

generated in other countries and with an assemblage of conditions nonexistent among us, we must suppose, whenever we observe them, that they are owing to contagion, even when we cannot point out the individual from whom it emanated.

Among exotic poisons, many are acclimated on our continent; they appear there without interruption, and produce at intervals, (doubtless with the concurrence of favorable atmospheric conditions,) epidemics of greater or less severity: variolic virus and that of scarlatina and measles, are examples. Other contagious diseases, or those so reputed, as the plague and yellow fever, manifest themselves, as it were, only momentarily: they usually disappear, after having committed their ravages for some seasons.

Linnæus published, in the *Aménités Académiques*, a dissertation wherein he endeavors to establish that all contagious diseases are owing to animalcules, which, by being transported from the infected to the healthy, transmit the disease, which is but the effect of their presence. The foundation of this theory may be seen in the work above mentioned; some very curious details, especially, will be found, relative to the form and habits of the *acarus dysentericæ*, but these are foreign to our purpose. The interesting researches which have since been made, have firmly established this opinion, as regards the itch; the existence of the *acarus scabiei*, is now demonstrated; but there is no reason for supposing anything analogous in other contagious diseases.

Such are the chief morbid causes, which, brought into action upon the economy, invariably produce the same effects. Their mode of action will be hereafter considered.

ARTICLE SECOND.

Predisposing Causes.

ACCORDING to the course generally agreed upon in the methodical study of all sciences, we have thought proper to speak first of the most *apparent* causes of disease; at present, we intend to examine those which are the least so, commencing with those called predisposing, which, as we have said, act by degrees upon the economy and prepare it for various affections. Their action is almost always obscure and often questionable. All that we shall say therefore, upon this action, must be considered as a collection of generally admitted opinions on the subject, rather than the consequence of facts rigorously observed, or the expression of our own conviction.

Some of the predisposing causes extend their action to a great number of individuals at once, as to the entire population of a city, a province or an empire; sometimes to large collections of men encamped, or in navies, hospitals and prisons; they favor the development of similar, or analogous affections in all who are

exposed to their influence: we shall style these, *general predisposing causes*. Others act only upon isolated individuals: these may be called *individual predisposing causes*. The principal morbid causes belonging to these two series, will now be briefly enumerated.

SECTION FIRST.

General Predisposing Causes.

The general predisposing causes are, for the most part, diffused in the atmosphere, or arise from certain local conditions.

Atmosphere. The air has a very decided influence upon the human body: this is, however, limited, and it does not at all follow that the state of the economy should be entirely subordinate to that of the atmosphere, as some physicians have pretended.*

The frequent changes of the atmosphere are occasional rather than predisposing causes of disease. It is more particularly, when for a long time in the same state, that the air seems to produce modifications in the human body, from which result various predispositions to disease. A cold and dry air predisposes to deep-seated inflammations, and active hæmorrhage, and gives to the greater part of acute affections which may be developed, their *character*, or what has been called *inflammatory nature*. A warm and dry air hastens the development of superficial inflammations, as erysipelas, and the exanthemata, and often gives to acute disease the form termed bilious. Affections of the mucous membranes and those called adynamic, prevail under the influence of a warm and moist air: catarrh, scurvy and rheumatism occur more particularly when the atmosphere has for a long while been moist and cold.

In our climate,† the north and east winds are almost always dry and cold; the south-east dry and warm; the south-west is of a warm and moist temperature; the north-west is cold and moist. The influence of these winds in the production of diseases is the same as that of the different qualities to which they correspond.

Air which is not renewed, quickly becomes vitiated, as may be remarked in confined apartments, especially in dungeons and subterranean passages. Man cannot remain long in such places without experiencing injurious effects; his functions languish, his

* *Talis est sanguinis dispositio, qualis est ær quem inspiramus.* — RAMAZZINI, *de Constitutione*, anni 1691.

† The reader will of course perceive the necessity of adapting the above remarks in regard to the influence of the winds, to "*our climate*;" our different position, as respects the ocean, changing wholly the nature of that influence: as for instance, the north and east winds *with us*, are almost uniformly moist and cold; the term "*dry*" is almost never applicable to our south-east wind, although it may, *sometimes*, be "*warm*;" our south-west winds are warm and dry, and our north-west, cold and dry. — TRANS.

constitution becomes enfeebled, and chronic affections of different kinds are developed. The stagnation of the air in the ravines of the Valais, appears (from the researches of Fodéré) to be the principal cause of the frequency of goitre in that country.

Considerable variations in *atmospheric pressure* may also be considered as causes of disease. Examples are cited of ocular hæmorrhage, of epistaxis and hæmoptysis determined by a diminution of the weight of the air, produced either by a change supervening in the atmosphere, or because the individual, being elevated into a higher region, was submitted to the pressure of a smaller column of air. The diminution and increase of atmospheric pressure have also been declared equally powerful causes of cerebral congestion and apoplexy.

Deprivation of *light* disposes to anasarca, to scurvy and scrofula, and always gives rise to a sort of etiolation, similar to that produced by the same cause in vegetables.

The researches of M. Edwards also go to prove that the action of light is necessary for the development of the body, and that its withdrawal may be considered one of the external causes productive of deformity in scrofulous children.* This agrees also with the generally admitted opinions upon the etiology of these affections. Hildenbrand has likewise remarked that absence of light greatly favored the contagion of typhus.†

Does *electricity* diffused in the atmosphere, aid in developing disease, as some modern physiologists have asserted? Can we admit the existence of a nervous fluid analogous to galvanism? Does it follow that vital power is increased when positive electricity is in excess; that it diminishes when negative electricity is most abundant, in low and moist localities, before storms, in warm seasons, and with a west wind? These purely hypothetical opinions are not suitable for present discussion.

As *Hippocrates* remarks, all diseases may manifest themselves at any time of the year; nevertheless, the natural changes which supervene in the atmosphere, by reason of the succession of *seasons*, influence very powerfully the development of many among them. This influence, which has been recognized from the earliest days of the science, has been confirmed by physicians of every age. *Hippocrates* remarked a uniform character among summer diseases; he likewise noticed some analogy among those of winter,‡ and he comprised among the former, the complaints common in the latter half of spring and the first half of autumn; and in the second class, those of the last of autumn and of the early spring. In our climate, more resemblance exists between the diseases of spring and of the months preceding and following that season, than between those of summer and the neighboring

* *Influence des Agens Physiques*, pp. 401 et 402.

† *Typh. conta.*

‡ *Aphor. lib. iii.*

months; the same observation applies to the complaints of autumn and winter, and those of spring and autumn form separate groups. The progress of the former is more rapid, their termination more complete, their duration less; in them, relapse is not so common, and remedies are more efficacious. The development of the other class is more gradual, their continuance far longer, and sequelæ of a bad and obstinate nature often succeed them; they do not yield as readily to treatment, and are more easily reproduced after momentary suspension. This difference has been particularly observed in intermittent fevers, vernal or autumnal; but it is by no means a rule of constant application. In our climate, the number of grave diseases is uniformly more considerable, and the mortality greater, in spring than in autumn.

In addition to the above marked differences which these two opposite periods of the year cause in disease, it has been observed that each season has, in like manner, a less noticeable, but still an incontestible influence.*

Winter, with a dry atmosphere, usually predisposes to inflammatory complaints, active hæmorrhages and cerebral congestions; when wet, to affections of the mucous membranes and chronic discharges. In summer, bilious diseases, cutaneous exanthemata, *cholera morbus*, mental alienation and various other neuroses, prevail. Autumn apparently contributes to the development of mucous and rheumatic affections, dysentery and intermittent fevers, which are more frequent at this season than at any other. Spring almost always abounds in inflammations of the throat and chest, and in hæmorrhages, etc.

The influence of the *moon*, and fixed stars, upon the development of disease has often furnished physicians with matter for discussion. If these bodies exert no action upon the temperature and moisture of the air, it is very likely that they have none upon the animal economy. But if, as many natural philosophers have asserted, tides, storms and the course of the winds are subject to the influence of lunar changes, the moon might possibly have a direct action upon the economy; an indirect effect might, at least, be demonstrated.

Localities. There is no part of the earth which is not habitable by man. But although capable of inhabiting every place, he cannot escape the influence which is thus exerted upon his constitution or the morbid modifications communicated. In southern climates,

* Some physicians, supposing they had observed that the principal changes caused by the seasons in prevailing diseases, did not correspond exactly to the divisions of the common year, proposed to form a *medical year*, in which spring should commence on the twelfth of February; summer on the twelfth of May; autumn in August, and winter in November; but, as there is no regularity in the period when the so-called vernal or autumnal diseases appear, as their manifestation even, is not constant, it is more reasonable to continue the usual limits to each great division of the year, and to the words in common use their general acceptance.

tetanus, yellow fever, and many diseases wholly unknown at the north, prevail; in the opposite latitudes, inflammatory affections are very frequent: in temperate climes a greater variety of disease exists. In dry and elevated districts, men are exceedingly subject to all the acute affections; chronic complaints, on the contrary, prevail in low and wet countries. This influence of elevated position may be easily verified in cities built both on high and low ground; in the upper portion, diseases are rare and of very rapid progress; in the lower, they are more frequent and tend to the chronic type.

A northern or eastern exposure, or a southern or western one have the same influence in the development of disease, as the winds blowing from either of these directions. (Page 32.)

City and country life dispose to very different affections. The neuroses, scrofula, rachitis and pulmonary phthisis are far more frequent among the inhabitants of cities than among those residing in the country; a country population is more exposed to acute disease, and chronic affections are rare. A residence in hospitals, prisons, vessels, and barracks apparently predisposes to dysentery, scurvy and different kinds of dropsy.

Change of abode likewise becomes a general predisposing cause for sailors and soldiers transported far from their country. *Lind* compares men who have left the land of their birth to vegetables transplanted into a strange soil; they cannot experience the new conditions in which they are placed, without injury to their health or a loss of vigor, at least for a time. The masses of men which are transported far from their country, the European troops which go to another continent, are often smitten by more or less severe disease, evidently owing to this cause; for these diseases not being known in the country where the men were born, they would have escaped them if they had remained there; of such is the yellow fever which destroys Europeans in some parts of America, and which has never been observed in the north of Europe, above the mouth of the Gironde; and abscess of the liver, so rare among us and so common in some parts of India.

An almost constant fact, to which the attention of physicians has not, perhaps, been sufficiently directed, is the good health on board fleets which traverse the seas without making any port, and which is singularly in contrast with the diseases that afflict them under opposite circumstances. The constant change of place seems useful to man upon the ocean, as well as on land; voyages generally preserve and strengthen the health; if passengers become diseased, it is almost always when they have been stationary for a certain time in the same place.

The changes brought about in certain situations through the agency of man, as the clearing of forests, or the cutting of canals, have sometimes produced a marked effect upon the sanitary condition of the population.

There are still some predisposing causes of disease, which may act simultaneously upon a great number of individuals, and which at present we shall only mention, because they act most com-

monly upon isolated individuals, and thus appertain more naturally to the individual predisposing causes. Such are clothing, food and the moral affections.

Wet *garments* suffered to remain upon the body, are one of the chief causes of rheumatism and dysentery in land armies, and of scurvy on board ship. If it surprise us that a cause, to all appearance the same, should produce different effects on land, and at sea, the reason of this difference may be discovered in the opposite qualities of rain and sea-water, the latter of which contains deliquescent salts, which prevent the complete drying of the sailor's garments and keep him constantly wet.

Food which has become putrid, salted meat, want of flour, or of fresh vegetables, and bad water, are all general causes of disease for the inhabitants of a besieged city, or for men in large numbers on board a fleet or in camp.

The *moral affections*, which are the same for the whole of an army, and sometimes for all the inhabitants of a city, or an empire, may be considered in some cases general predisposing causes. The influence of these affections upon the health of our soldiers, in the disastrous campaigns of 1813 and 1814, was very evident; the number of diseases increased in a frightful degree, as fortune forsook our banners.

Political institutions, and the more or less advanced state of civilization of different nations, must also be ranked in the number of the general predisposing causes of many diseases; it is for this reason that in free countries, among enlightened people, where the intellectual faculties are most active, where man devotes himself to the study of the sciences and arts, to commercial speculations and to labor, and among nations often distracted by violent political commotions, mental alienation and hypochondriasis are far more frequent than where the people live in idleness, ignorance or slavery.

SECTION SECOND.

Individual Predisposing Causes.

Individual predisposing causes are much more numerous than those termed general, because there are many circumstances which may act upon isolated individuals and cannot be common to a great number; while all the general predisposing causes, as situation, dwelling, etc., are also individual predisposing causes.

These causes being very numerous, and their influence in producing disease not being the same, we shall divide them into two series. In the first, will be classed the various conditions peculiar to each individual, as birth, age, sex, temperament, constitution, habits, profession, degree of comfort or privation, illness, convalescence, health, and pregnancy; and we shall designate these

different conditions by the term *aptitudes*, since they *dispose* the individuals to various diseases, rather than take an active part in their production.

In the second series will be enumerated those various *external* circumstances, which predispose with more or less energy to the development of disease.

I. APTITUDES.

A. A *descent* from parents affected with certain diseases, is a condition which should lead us to fear the development of similar affections. "The ailments of our parents," said Baillou, "are inherited as well as their goods, and this sad inheritance is far more certainly transmitted than the other." Diseases which thus pass from father to child, are called *hereditary*; sometimes, so to speak, they skip one generation and manifest themselves in the grandchildren. They may appear in every child; but usually, only in a limited number. They may be transmitted by either father or mother. *Cullen* has observed that children are most subject to the diseases of the parent whom they most resemble.

The diseases of the mother are perhaps more commonly transmitted than those of the father, not only because there is certainty in regard to the maternity, but also because the female, whose part in the act of conception is equal to that of the male, supplies from herself alone, what is required for the development of the fœtus during its entire intra-uterine existence, and also nourishes it from her own substance through the whole period of nursing. It is, therefore, natural to suppose that the mother has a greater influence than the father upon the child's constitution, and upon its predisposition to disease. In support of this opinion, let it be remembered that in the crossing of animals, the relative influence of the two sexes is quite manifest: the mule, which is the issue of the mare and the ass, is incomparably larger and stronger than the product of an opposite cross.

There is no longer any dispute in regard to the transmission of diseases from parents to children, considered in an abstract manner; but admitting this first point, discussions arise with regard to the question of the hereditary nature of particular diseases. There could be no doubt on this point, if the affections were such as show themselves only in the offspring of those who had suffered by them, and if all the children of parents so affected were attacked without exception; but this is not the case. On the one hand, every disease susceptible of transmission from parents to children may occur from other causes, and on the other, there is no cause which uniformly affects all the children who become diseased; it is only by aid of exact and numerous observations, which science does not yet possess, and which it can only slowly acquire, that we shall be able to appreciate the relative frequency of a disease in individuals born of affected parents, and in those whose

parents have been exempt from it, and thus determine how far a disease is hereditary.

When we wish thus to study any disease, phthisis, for instance, we must seek the solution of the problem more by following the course of the children's lives, who are born of parents destroyed by this disease, than by going back to the complaints of which the parents died. It is, indeed, needless to examine whether the disease may be developed or not by the aid of hereditary predisposition and occasional causes. This is not the question: no author has asserted that a disease susceptible of transmission from father to child could not be developed likewise by other causes. The real question is, to determine at first, if such a disease is transmitted from parents to children, and afterwards, how frequently this happens. It is then, by following the generations, rather than by tracing them back, (if we may be allowed the expression,) that the question of hereditary disease must be studied and definitely decided. We are convinced that by following this course in regard to pulmonary phthisis, results will be obtained, proving that children born of phthisical parents, die, in a great proportion of cases, of the same disease. It is not so easy to say what would be the result of similar research with the intention of ascertaining whether cancer is hereditary. In the present state of science, it appears to us reasonable to allow, without however affirming it, that individuals born of cancerous parents, are, other things being equal, more often affected with like complaints than those who are not thus connected.

In general, diseases which are developed under the influence of hereditary predisposition, are manifested at an earlier age than when not thus transmitted. It has been remarked, that children born of consumptive parents, died at a less advanced age than their parents, and often before they were old enough to transmit this unfortunate predisposition.

Reputed hereditary affections are exceedingly various. Some consist in an evidently vicious conformation, for instance, a diminution or increase in the number of organs; others, in simple functional disturbance without any appreciable lesion of the tissues, as blindness or deafness. Some are congenital, as is occasionally the case with syphilis, etc.; others, and by far the greater number, are latent for a longer or shorter time after birth; rachitis until the second or third year; scrofula and epilepsy appear in infancy; pulmonary consumption and mental alienation in youth; gout and hæmorrhoids in adult age; apoplexy still later. In some families hereditary disease is developed and terminated, uniformly at the same period of life. *Montaigne*, whose ancestors were affected with gravel, was attacked by it at the same age as his father. Some practitioners have thought that chronic affections only, could be transmitted from parents to children; and it should be remembered that phthisis, mania and epilepsy occupy the first rank among hereditary diseases. Gout and rheumatism, however, are usually, acute diseases, at any rate

in their first attacks, and by common consent, are hereditary. In some families it has also been observed that there exists a tendency to plethora and to certain inflammations.

The diseases which infants exhibit at birth, (*maladies de naissance*,) are not always hereditary; those affected with hydrocephalus or spina bifida, die soon; they cannot, consequently, transmit these diseases, and for the same reason they cannot have inherited them. Still farther, it has been remarked in certain cases, that all the children, or most of them, have been attacked by disease with which their parents never had been or could be affected; among other instances is sterility, noticed in all the daughters born of the same parents. Squamous disease of the skin and scrofula appear sometimes in all the children born of the same parents, although they may never have had those diseases. We must then, with Portal, admit *family diseases*, which although never observed in father or mother, but declaring themselves in all their children, are evidently ascribable to the influence exercised in generation by the concurrence of two determinate organizations, which give rise to one differing from each of the others, the same thing happening in all the offspring of such connection.

We shall not give a detailed account of the different theories which relate to the hereditary transmission of disease. Like external characteristics, this transmission is a well marked phenomenon, but quite as inexplicable. The various hypotheses on this subject may be seen in the little work of *Meara*.* The *Considerations* of *Portal* upon hereditary and family diseases will be read with much greater interest by those who prefer facts to explanations: in this work the learned author has collected all that is useful and curious upon this point in pathology.†

B. *Age*. This is not, properly speaking, a morbid cause. No period of life plays an *active* part in the production of disease, but there is greater liability to certain affections at some ages than at others. Some complaints never appear previous to or after a certain period; on this account, those aptitudes for contracting disease which belong to the different ages, possess a peculiar interest for the student.

Many affections may be developed at all periods of our existence, from intra-uterine life to the most advanced age. Children have been born with intermittent fever and with variolic eruption, both of which may occur at any other age. There are, however, diseases peculiar to every age, or at any rate of more frequent occurrence during such periods. Hydrocephalus and spina bifida are developed while the fœtus is yet *in utero*. The diseases most frequently noticed at birth are the asphyxia of the *new-born*,

* *Pathologia hereditaria generalis, sive de morbis hereditariis tractatus, spagyricodogmaticus*. — (Authore, Derm. Meara; Dublin 1619.)

† *Considerations sur la Nature et le Traitement des Maladies de Famille et des Maladies héréditaires, par Antoine Portal*. 1814. Paris.

icterus and hardening of the cellular tissue. From the first to the seventh year, the child is chiefly exposed to the eruptive fevers, to the accidents of dentition, epistaxis, croup, whooping-cough, tinea, rachitis, scrofulous complaints, acute hydrocephalus, tubercular meningitis and verminous affections. The period of puberty in females is fraught with various diseases. In both sexes, rapidity of growth sometimes disposes the system to serious affections. Plethora, inflammatory disease, hæmoptysis, angina and pulmonary consumption are more frequent in youth than at any other age. In middle life, hypochondriasis, hæmorrhoids, cancer and the greater portion of organic diseases occur, scrofula excepted. In old age, softening and hæmorrhage of the brain, idiocy, deafness, cataract, affections of the urinary passages, etc., are more common than in earlier life.

The etiological study of the different ages offers still another consideration, viz. the inaptitude of certain ages for developing certain diseases. Thus cerebral hæmorrhage is hardly ever observed before middle life; nor scirrhus and arterial aneurism previous to the thirtieth year; typhoid fever has perhaps never been observed after the age of fifty-five. These data are occasionally very useful in diagnosis.

C. The ancients supposed there were certain fixed years in human life, when diseases were more frequently developed and attended with greater mortality. They called them *climacteric years*, from the word *κλίμα*, *tendency*, or from *κλίμας*, signifying a scale or degrees. They compared these years to knots, which might be said to unite the different periods of life, and to give a new direction to the economy. This doctrine, which is said to have been derived by Pythagoras from the Chaldean institutions, was for a long time in great favor in the schools. Nearly all who have admitted the climacteric years, have fixed them at intervals of seven years; they asserted the fourteenth and twenty-first years to be replete with danger. Others have divided them into periods of nine years. Some mingled the two, and the sixty-third year, composed of the numbers *seven* and *nine*, was, in their estimation, the most fruitful in diseases, especially those of fatal termination. Others preferred a triennial interval. All of them supposed that the space of time they thus allotted, was requisite for the complete renovation of the constituent elements of the body; so that at the end of three, seven and nine years, there did not remain in the system any of those parts which previously composed it; and, admitting this entire change in the constitution, an analogous change in the health seemed to them the almost unavoidable consequence. It is very certain, that in an indefinite time, varying according to age and many other circumstances, the body is renewed, and that hardly any of its former constituent parts are then found in it; but this change is not a sudden one: it is continuous, and modifies unceasingly the component parts of the body. It is no more perceptible at the seventh or ninth year, than upon every day which

goes to make up the climacteric periods. These useless speculations have, with great reason, been rejected; they seem fitted merely to torment the imagination of the sick.*

D. The *sexes* are nearly alike in their predisposition to most diseases: fevers, inflammations, nervous and organic affections, attack males and females without distinction. If there be any difference between their diseases, it is rather to be attributed to the mode of life, than to sex. If the male be more subject to wounds, contusions, fractures, rheumatic affections and typhus, it is because he is more exposed to the causes of such affections. In like manner, in cities, women are more subject to nervous diseases than men. But in the opposite case; if we compare the female who labors in the fields, to the man who leads a luxurious and inactive life in the city, the former will be observed to be liable to the same complaints as the man whose occupations are similar, and the latter to all those nervous affections which have been considered as peculiar to females. There are, indeed, certain diseases which attack one or other of the sexes most frequently; of these, tuberculous disease of the lungs is more common in females than males; and that this difference is observable in every period of life, any one may be convinced by consulting the statistics of M. M. Louis, Benoiston de Chateauneuf and Papavoine.

There are certain diseases which almost exclusively belong to sex: not to mention those of the genital organs and their appendages, as hydrocele and sarcocoele in man, scirrhus and inflammation of the uterus and ovaries in the female, stone in the bladder and retention of urine are almost exclusively confined to the male sex, while crural hernia, hysteria and mammary cancer are peculiar to women.

E. *Temperament* predisposes to various affections, and gives a peculiar character to any that may be developed. In the sanguine temperament, there is a tendency to plethora, to deep-seated inflammation, hæmorrhages, etc.; and almost all the acute diseases occurring in persons thus constituted, are accompanied with general symptoms of inflammatory fever. The bilious temperament is conducive of bilious diarrhœa, the exanthemata, inflammations of the membranes and organic disease, especially cancerous degeneration. Those of a lymphatic temperament are peculiarly liable to catarrh, chronic discharges, dropsy, scrofula, and scurvy; and nearly all the acute diseases which affect them are of an adynamic character, and slow in their progress. Those of a nervous temperament are particularly subject to hysteria, hypochon-

* Some authors have given a different signification to the word *climacteric*: they understand by it the *periods* of life at which great changes occur, independently of the numerical order of the years; such is the epoch of puberty in both sexes and the suspension of the menstrual discharge, or *critical season*, in females. Every one allows the influence of these *climacteric epochs* upon the constitution and health.

driasis, convulsions, disturbance of the sensations and intellectual faculties, melancholy, mania, etc.; and in addition to the ordinary symptoms of acute disease, various disorders of innervation, which alter the character of the affection, make its course irregular and its termination less certain. The mixed temperaments predispose, though less energetically, to the affections peculiar to each of the temperaments united in the same individual.

F. A very strong *constitution* seems rather a preservative against all disease than a predisposant to any. Nevertheless, it has been observed that such constitutions are more subject than others to acute and violent inflammatory affections. Those of feeble constitution, on the contrary, are liable to frequent and slight attacks of disease, and to habitual indisposition, and nearly all of them die of chronic disease. It has also been remarked, but without sufficiently accurate data, that very corpulent persons are subject to apoplexy, and are almost entirely exempt from inflammations of the thoracic organs.*

The disposition of each part of the body seems also to have an influence in hastening the development of disease. Considerable volume of the head should lead us to apprehend hydrocephalus in children and apoplexy in the aged. A remarkably broad chest excites suspicion that the contained organs have a size disproportioned to that of the other viscera, and this disposition is like the first stage of cardiac aneurism. Those in whom all the cavities are large, or to use the expression of *Hippocrates*, who have voluminous viscera, are, according to this prince of medicine, liable to arthritis. The weakness of the aponeuroses which correspond to the natural apertures of the abdomen, is the chief predisposing cause of hernia. The structure of the bones in children, favors the detachment of their epiphyses and their abnormal curvature; in the adult, the angles which the neck of the femur forms with its supporting bone, and the ramus of the lower jaw with its body, favor the fracture of the one and the dislocation of the other. Finally, in the aged subject, the diminished thickness of the compact part of the bones, the predominance of their inorganic element, and the increased size of the medullary cavity of the long bones, are each circumstances explanatory of the frequency of fracture in old age.

G. *Habits*, which arise from the frequent repetition of the same acts in a given time, are usually injurious to those who become enslaved by them, and they are very properly numbered among

* *Obesa corpora minus pleuritidi et peripneumonix sunt obnoxia, ut animadvertit aequè diligens ac eruditus medicus Trillerus. Quod cum omnes peripneumonicos a me visos aut curatos memoria repeto, verum esse intelligo; et ipse poteris, perlectis eorum qui a Valsalva itemque à me dissecti fuerunt historiis cunctis, duobus exceptis, facile cognoscere. (MORGAGNI de Sed. et Caus. morb., Epist. XX. art. 10.)*

the predisposing causes of disease. The power of habit and the danger of its discontinuance are in proportion to its duration and the number of actions committed under its influence in a given time. So great is this power that, as *Cabanis* has remarked, it would be dangerous to change from the worst regimen to the wisest and best. Now as there is no habit which we can be sure of satisfying through life, it is prudent not be bound by any, unless absolutely compelled. Many habits are injurious to the health from the moment they are contracted; all may become so if interrupted.

H. The *professions* may predispose to different diseases, by the concurrence of circumstances in which those practising them are placed. Literary men are subject to headaches, wakefulness, and hæmorrhoids; many die of apoplexy. Faggot-bearers are subject to hernia; watermen, to a peculiar alteration of the dermis, characterized by softening, fissures, and frequently absorption of the parts in contact with the water;* while, contrary to the common opinion, they are rarely affected with ulcers of the legs;† varicocele is of frequent occurrence in horsemen.

I. Statistics collected by numerous distinguished physicians, demonstrate satisfactorily the sad influence of *poverty* upon mortality. Dr. Villermé has proved by very interesting researches, that in Paris and many other large cities, the proportion of deaths to the number of inhabitants in the different quarters, is in an inverse ratio to their degree of comfort.‡ M. Benoiston of Chateauneuf has arrived at similar conclusions; he has observed that, at the same periods of life, the mortality among the poor is almost double that of the rich.¶ The diseases most usually observed under these circumstances among the poor are scurvy, scrofula, tinea and some other exanthematous diseases; in the higher classes, inflammatory and nervous diseases are most frequent.

It nevertheless sometimes happens that similar affections, not contagious, such as catarrh and erysipelas, prevail simultaneously in both classes.

J. The state of *health*, of *convalescence* or of *disease*, has likewise an influence upon the facility of development of various affections.

It would be absurd to rank health among the preparatory causes of disease. There are, however, certain affections which are observed only in those who previously enjoyed perfect health; such is the ephemeral fever produced by an evident external cause;

* This affection, peculiar to the skin, has received the name, *grenouilles*. See the Memoir of Parent-Duchâtelet upon porters employed to unload boats. — *Annales de hyg. publ.* t. iii. p. 245.

† Of 670 boat porters examined by Parent-Duchâtelet, one only had an ulcer.

‡ *Annal. d'hyg. et de méd lég.* t. iii. p. 294.

¶ *Annal. d'hyg. et de méd. lég.* t. iii. p. 5.

the same cause would have excited in another person a more serious malady, etc. Descriptions of epidemics also exist, in which the prevailing disease attacked healthy individuals by preference, as it were, while feeble and infirm persons escaped. But the opposite of this has been almost constantly observed, and a diseased condition must always be considered as favorable to the development of prevailing complaints, and as a predisposing cause of various affections. *Diemerbroeck* states, that in the plague of Nimègue, all those who were attacked by any complaint whatever, were soon afterwards affected with the contagious malady; the same was remarked in the epidemic cholera of Paris in 1832, and has been noticed in many other epidemics. Oedema of the glottis scarcely ever occurs except among patients already seriously ill. Convalescence is accompanied by a debility and susceptibility, which greatly accelerate the action of morbid causes.

K. *Pregnancy*, likewise, renders the system liable to different diseases. Many women experience some nervous affection during gestation, as vomiting, depraved appetite, cramp and convulsive movements; or plethoric accidents, as headache, ringing of the ears, oppression, or palpitations, which yield to venesection, etc.; during the period immediately succeeding delivery, the susceptibility of women to attacks of acute disease, to which the epithet *puerperal* is given, is singularly augmented; every one knows how frequent these affections are; the uterus with its appendages is most usually the origin of disease; acute metritis supervenes more often under these circumstances, than in any others. The same is true in inflammation of the mammæ during lactation. Nursing women, and those who have lately weaned their children, are very easily affected by the action of the productive causes of rheumatism: they often experience its attacks, and it then receives the popular name of *milk pains*.

2. INDIVIDUAL PREDISPOSING CAUSES, PROPERLY SO CALLED.

Having pointed out the various conditions which we have styled *aptitudes*, and which may predispose to disease, we shall briefly examine the individual predisposing causes, properly so called, which belong to the second series.

A. General causes prevail in the class of the *circumfusa*; still there are some that act upon isolated individuals, as the frequenting of *dissection rooms* and *hospitals*, which disposes to disease of an adynamic character; also an habitual residence in confined, ill-aired, and overheated apartments, which renders the body more sensible to external cold, and more likely to be affected by it.

Change of climate, which is a general predisposing cause for troops transported to the colonies, is more frequently an individual

predisposing cause. The inhabitants of the *country* when they come to reside in *cities*, almost always experience some disorder; within the first few days, diarrhœa, or severe fever after some months' residence. The greater number of those who retire to the country, after having spent the first part of their lives in cities, as for instance, merchants who have become independent, or public functionaries who have lost their situations through political vicissitudes, soon experience more or less disturbance of health, which often results in death. But we should observe, that, in all such cases, many other alterations assist the mere change of dwelling-place in causing the result thus observed.

B. Some individual predisposing causes are found among the *applicata*. *Clothing*, when too thin, favours the action of causes productive of catarrh and rheumatism. That which is too warm, determines indirectly a similar effect by increasing the susceptibility. The form of the dress, which changes according to the fashion and tastes of the various classes of society, is not without its influence upon the health. Many physicians think that the costume adopted since the French Revolution, has contributed very much to render pulmonary consumption more common among females, and croup among children; the exposure of the neck, the arms, and the upper part of the chest, accounts apparently for the frequency of these diseases. It has been said also, that the Greeks and Romans, whose legs were habitually bare, were more subject than we are, to erysipelas of those parts.

Among the morbid agents belonging to the *applicata*, those acting through the medium of *compression* probably produce the most remarkable effects.

The immediate effect of all compression is to diminish the volume of the parts subjected to it, and almost constantly to interfere with the action of the organs, to retard the circulation of the fluids, and particularly of the venous, and even the arterial blood. In this case, compression may have a rapid and manifest effect, like the specific causes; the gangrene which occurs in a tumor, whose base is surrounded by a ligature, and asphyxia caused by compression upon the trachea, are examples; but in the great proportion of cases, the effects of compression manifest themselves slowly, like those resulting from the action of predisposing causes.

These effects, which are exceedingly various, might belong to either predisposing or determining causes; still we have included them under one head, so as not to separate them from those phenomena which are more interesting when studied collectively; they depend on the nature of the compressing agents, the structure of the parts compressed, the time during which the compression is continued, the extent of surface compressed, and the force with which it is applied.

1. The agents capable of producing compression are very numerous: some are applied to the surface of the body, as the cloth-

ing, particularly corsets, garters, and girdles; others, whose action is internal, are either foreign bodies or morbid growths, as tumors, effused liquids or gases, which become an actual cause of various secondary disorders by means of the compression they maintain upon the neighboring organs.

The elastic corsets used by most females, are, probably, one of the causes which lead to the development of organic disease of the lungs and heart, particularly during the period of growth and that of pregnancy, when the chest should rather be increased in volume. In this latter case, there are many other inconveniences: the pressure upon the abdomen prevents the development of the uterus, tends to give it an abnormal position, and may excite abortion. Their action upon the mammæ is not less marked: it prevents their attaining the increased volume which they should acquire, flattens the nipple, and renders nursing difficult or impossible. The stomach and intestines thus compressed, sometimes assume a faulty position, the exercise of their functions is always impaired; the inconvenient and noisy borborygmi, so frequent in females, are probably owing to the compression of the intestines by corsets; this is scarcely ever observed in men.

Compression, however slight, if long continued, caused by surgical apparatus, or by a simple bandage intended to support the dressing of an issue, may sensibly diminish the volume of the part compressed, and sometimes may occasion œdema of that portion of the limb in which the venous circulation is obstructed. Garters, when very tightly drawn, may cause varicose dilatation of the veins. Very narrow socks worn in childhood, change the conformation of the toes, and at any age produce a thickening of the skin and the development of those hard and painful tumors called *corns*; but friction contributes to this result. The synovial cyst called *hygroma*, which is formed in the neighborhood of the knee and elbow, in workmen whose employment forces them to press continually upon these parts, either with the instrument they use or against the table at which they work, is an analogous formation. Compression of the neck, by a tight cravat, excites or increases the distension of the cerebral vessels, and favors hæmorrhage and inflammations of the brain.

Internal compression, caused by a tumor, affects the organs in various ways. It attracts but little notice when the tumor is beneath the skin or between the muscles, because the resistance is slight and the compression consequently less. The case is nearly the same when the tumor occupies the superficial portion of the abdomen, whose anterior parietes are susceptible of considerable extension. But it is otherwise within the skull, the thorax, the nasal fossæ, and even the inferior parietes of the mouth.

The primary effect of tumors developed within the skull is to compress the corresponding cerebral hemisphere, and to induce more or less complete paralysis of the muscles of the opposite side. If the tumor be near the bony arch of the skull it often happens that it gradually reduces the thickness of the bone, even to

the tenuity of parchment, and in some cases completely perforates it, making its appearance through the aperture; fungous tumors of the dura mater often present this series of phenomena. Analogous effects occur in the chest: such as functional disturbance, and absorption of the parietes. If the tumor be in the vicinity of one of the axillary regions, it sometimes causes, by compression of the artery, a progressive decrease in the force of the pulse upon that side, and by compression of the veins and lymphatics, œdema of the corresponding limb.

If the compressing agent be a fluid, its effect is only distension of the natural or adventitious cavity which encloses it, and interference with the action of neighboring organs, as is uniformly noticed in the abdomen, often in the thorax, and occasionally in the skull, where ossification is incomplete; but absorption of the bony walls never occurs, as it does from solid tumors.

2. The structure of compressed parts has great influence upon the phenomena of compression. This may be easily appreciated in the chest, where the organs differ very much from each other in texture, and whose parietes are composed of both hard and soft parts. It is observed that the softer and more flexible the tissues, the less change occurs in their texture, in consequence of the tumors which compress them; on the other hand, the harder they are, the greater effect is produced. Thus an aneurismal tumor of the arch of the aorta causes absorption of the sternum, cartilages of the ribs in front, and of the vertebræ behind, while, for a long time, it simply displaces the heart, and diminishes the volume of the lungs.

If the trachea be compressed, the cartilaginous rings are first destroyed; their uniting membrane resists for a long time, as do the intercostal muscles when the ribs and their cartilages are already absorbed. In the case where the tumor opens into the bronchial tubes, the œsophagus, pleuræ or pericardium, and causes death, the comparative examination of the different parts shows that the lesion of those which are hard and resistant is greater and of earlier date than that of the soft parts. We should notice that there is here something special in the nature of the compression, on account of the pulsation occurring in aneurismal tumors; both percussion and compression exist. The application of this principle and the proof of its truth is found in the tumor known as *ramula*, which causes absorption and deformity of the lower maxillary bone and of the teeth therein inserted, and only occasions simple displacement of the soft parts. But in all these cases the latter resist only by reason of their elasticity under the force of the compressing agent. If compression be so applied as that they cannot thus escape it, they feel its effects, and indeed much sooner than the firmer tissues; as is observed by the formation of eschars on those portions of integument compressed between superficial and projecting bones, as the sacrum, the great trochanters, and the bed on which the patient lies.

3. The effect of compression is proportionate in great measure to

the time during which it is exercised. When short, even though very violent, provided it be not carried far enough to cause alteration in the tissue of the organs, the latter immediately regain their size and the full exercise of their functions. After longer compression, for some days, or weeks, for instance, the natural condition is slowly, but may be completely regained. It is far otherwise when compression has been continued for a considerable time, as for years; it then most usually happens that the suffering organ does not regain its primitive volume; this is particularly the case with the lungs after pleuritic effusions. There is, moreover, this difference between compression of short and long duration, that in the former, the diminution in volume seems alone owing to the *liquid contents being discharged* and the solid parts brought more closely together, while in the latter there is a real decrease in the solids themselves, partial emaciation or atrophy.

4. The extent of surface over which compression is applied, also modifies its effects. A very narrow bandage may penetrate the tissues; a broader one would not. When compression is maintained upon one particular portion of a limb, the circulation becomes arrested below the point of application. This does not happen if the compression extend to the extremity of the limb. Such are the chief effects of compression in the development of disease either primitive or secondary, whatever be the agent or the recipient organ.

Beds also deserve some attention. The habit of sleeping upon feathers, by increasing cutaneous transpiration, favors the formation of urinary calculi and disposes to nephritis. A hard bed does not seem a predisposing cause of any complaint. *Seats*, which are very soft, and particularly those furnished with feather cushions (*bergères*), are conducive of sanguineous congestion in the uterine and hæmorrhoidal vessels.

The daily use of *cold baths* is thought to predispose to inflammatory disease by their tonic action upon most of the organs. *Warm baths*, often repeated, produce an opposite effect; they weaken the constitution, and predispose to chronic discharges and diseases of debility. *Want of cleanliness* generally favors the development of all contagious and cutaneous diseases. *Excess* of cleanliness, combined with the use of perfumes and the various resorts of luxury, seems to aid in the production of nervous diseases.

C. *Ingesta*. Food, liquids and remedies may dispose to various diseases when improper use is made of them.

In health, the quantity of *food* and *liquid* should vary according to age, strength, occupation, habits, etc. Their moderate and temporary increase or diminution does not usually produce functional disturbance, but beyond certain limits the health becomes deranged.

A decided and long continued diminution in the ordinary quantity of food causes analogous loss of strength and flesh; its increase produces plethora. Habitual excess in food seems to dispose to

organic disease of the stomach and intestines, which is not always avoided by extreme abstinence. The daily abuse of fermented liquors, of wine or alcoholic drinks, gives to acute diseases so grave a character as to render them generally fatal.

Wine and alcoholic liquors are more pernicious in their effects when drunk between meals than when taken into the stomach mixed with solid food. The disease known as *delirium tremens* is often owing to the abuse of these drinks, or to their sudden abstraction from the intemperate.* According to some physicians, sudden death and spontaneous combustion are not rare in persons who use habitually a large quantity of alcohol. The immoderate use of coffee disposes to cerebral congestion and inflammation of the stomach; tea, on the contrary, weakens this viscus gradually, and seems to predispose to chronic discharges. Some authors have attributed the frequent occurrence of leucorrhœa in women residing in cities to this cause, and others have seen the use of beer produce blennorrhœgia in both sexes. It has been said that the use of cider and beer in England and Normandy, is the chief cause of the rheumatism so common in those countries; but is not this rather to be attributed to the conditions which prevent the cultivation of the vine, and to the moisture of the soil?

The bad quality of food containing in itself but little nutriment, or altered by putrefaction, fermentation or mouldiness, disposes to disease of more or less severity, as inflammations of the digestive canal, adynamic fevers, scurvy, etc. The use of bad water, like that drunk on shipboard during long voyages, of sour wine, or badly prepared cider, produces analogous effects.

Variety in food is necessary to man. The satiety experienced after having for a long time used the same alimentary substances and the satisfaction experienced by a change, prove the truth of this assertion. The exclusive use of any one article of food, in those whose unrestrained habits would have been opposed to such a course, almost always terminates in disease; farinaceous food disposes to plethora, fat and oily articles induce chronic discharges, and animal substances give rise to inflammatory complaints of every description; salted food, in conjunction with want of vegetables and the fruits of the season, produces scurvy; the prolonged use of a scanty regimen is a frequent cause of obstinate constipation and various digestive troubles, in those who fast throughout Lent.

Spices and powerful *condiments*, as pepper, mustard, pimento, etc., increase, at first, the energy of the stomach; but this viscus becomes accustomed to the action of such excitants, which soon cease to stimulate it, and inactivity frequently succeeds the temporary excitement. The abuse of these substances may cause inflammation of a part or the whole of the digestive canal, of the mouth, the pharynx, stomach and intestines.

Medicines, considered by most persons as means of preserving

* BLAKE, *Edinb. Med. and Surg. Jour.*, t. xix.

and re-establishing the health, may sometimes disturb it. Remedies styled *precautionary*, far from strengthening, often injure the health. Repeated emetics have finally caused weakness or even inflammation of the stomach, and purgatives thus used have had the same effect on the bowels. The use of medicine not indicated in the course of a disease, may instantly cause a new affection or aggravate the existing complaint.

D. Excreta. The *evacuations* may vary considerably without derangement of the health; usually, one being augmented, another is diminished, so that the balance of the system is preserved. Slight changes in the quantity of the evacuated matters, either more or less, do not suffice for the production of disease; but when the disproportion between the excreted matter and the reparatory means becomes very considerable, it acts upon the constitution and so modifies it, as to predispose it to various affections. If the quantity of food daily assimilated be greater than the portion excreted, a tendency to plethora and inflammations of every kind is the consequence; if, on the contrary, absorption is not sufficient for the reparation of the daily losses of the economy, the body gradually diminishes and is liable to complaints resulting from debility. Profuse sweating, copious salivation, too great secretion of milk in nurses, etc., cause the latter effect. In man, venereal excess and masturbation act in a similar manner, with this peculiarity, that nervous phenomena almost always accompany the debility arising from repeated evacuations of semen.

The debility induced by excessive evacuations, brings into action the occasional and determining causes of disease. Thus a man who, during his whole life, has exposed himself with impunity to the inclemencies of weather, is attacked with rheumatism, when exposed after excess in venereal indulgence.* The same circumstance disposes to attacks of yellow fever at St. Domingo;† and Diemerbroeck‡ observed at Nimègue, that all who married during the continuance of the plague, were attacked by the contagion a few days after their nuptials. Abundant hæmorrhage, bleeding, and repeated purgatives, have had the same effect during many other epidemics.

Natural or artificial evacuations, when reproduced at nearly equal intervals, have a very different effect, especially when they are confined within certain limits; the system repairs and supports these losses, either by the diminution of other evacuations, or by the assimilation of a greater proportion of food; from this, plethora results. Periodical evacuations, natural or artificial, cause this to yield, but at the same time they increase the tendency to its reproduction, so that nothing more strongly predisposes to plethora, or at any rate, to strengthen the predisposition to it when

* *Essai sur la Rhumatisme*, 1813.

† *Traité de la Fièvre jaune*, par BALLY.

‡ DIEMERBROECK, *de la Peste de Nimègue*.

existing, than these evacuations. The menstrual discharge in females, periodical hæmorrhoids in males, and habitual bleeding in both sexes, often produce this effect.

The suppression of habitual evacuations, the omission of customary bleeding and purging, may tend to produce various complaints; but they act generally as occasional, rather than predisposing causes.

E. *Gesta*. The precise degree of action and rest, of sleep and waking, to which man should restrict himself in order to preserve his health, cannot be determined; nevertheless there are certain bounds which he can rarely pass without deranging the harmony of the functions.

Any marked disproportion between *exercise* and *repose* always injures the health; *too great fatigue* induces a kind of debility, and gives an adynamic character to acute affections developed under such conditions. It has been said of country people, that usually they have but one disease in their lives, and that fatal to them. Partial exercise may also predispose to certain affections; the continual and repeated movements of the arms, for instance, seem calculated, in a greater degree than those of the lower limbs, to bring on hæmoptysis in those subject to it, and to hasten the progress of cardiac aneurism.

The *want of exercise* is far more replete with danger than the opposite extreme; this is more decidedly the case in proportion as the individual has need of exercise, on account of his age, habits, and strength. Thus it is most injurious to children, to robust persons, and to those who have always led an active life. It is observed that a sedentary life is less prejudicial to the female than to the male, either because, from youth, habit has lessened in her case the troubles arising from it, or because such a life is more conformable to her peculiar destination, and consequently to her constitution. Want of exercise is the source of many disorders. One of its first effects, is loss of appetite and slow digestion; dyspepsia frequently recognizes this as its sole cause, and yields only to regular exercise. Prolonged inaction causes debility of the locomotive organs, favors sanguineous congestion towards certain parts, and vitiates nutrition; the body increases in size and loses strength; adipose polysarcia, mucous discharges, scrofula, and œdema, are the different results of this inaction when carried to a great extent, the effects varying according to the constitution of the individual. The same cause, in a less degree, exercise not being quite sufficient, disposes to plethora, especially in high livers. Inaction of a single limb usually produces mere local effects, such as weakness, diminution of size, and atrophy of the part which is kept motionless.

That change, which is necessary in all the acts of life, is especially so in regard to the *positions* of the body. The restraint arising from too long retention of one position, the need of changing it at intervals, even during sleep, had already established the

truth of the above assertion, even prior to its adoption as a hygienic precept. The upright posture, when habitual, disposes to varicose affections, œdema of the legs in both sexes, varicocele in man and prolapsus uteri in women; the sitting posture, to hæmorrhoids and engorgement of the abdominal viscera; the kneeling posture induces lumbago and early curvature of the spine; horizontal posture favors cerebral congestion, epistaxis and apoplexy. This latter position, when maintained for many months, on account of fractures of the lower limbs, has often seemed to be the main cause of calculous formations in patients who had never previously been so affected.

A proper division of our *sleeping* and *waking* hours is useful in maintaining health. From six to eight hours' sleep are necessary for adults; less is requisite for old persons, and more for children. But here, as elsewhere, general rules admit of exceptions; some persons need nine or ten hours' sleep; four or five are sufficient for others. Prolonged sleep induces general sluggishness, and predisposes to plethora and cerebral affections. Those who retire and rise very late, who sleep in the daytime and remain awake at night, hardly ever attain to an advanced age. After long watchings, nervous affections are frequently developed, and particularly great irritability of the nervous system.

F. *Percepta.* The sensations, passions, and intellectual efforts, when they exceed certain limits, become predisposing causes of disease.

Sensations, habitually very feeble, augment by degrees the sensibility of the organs which are their seat, to such extent that they become unfit to bear those which are moderately powerful: this is observed in individuals who remain for a long time in a dark abode, and among those who live upon very unstimulating food. *Sensations* habitually very lively, on the contrary, exhaust the sensibility of the organs, and render them unfit to fulfil their functions.

The *passions* have a very remarkable influence upon the development of disease. While the mild and varied, favor the harmony of the functions, the strong and exclusive, are injurious in the same degree. They not only may affect the system in a sudden and marked manner, as in the instances of derangement, instant death and hectic fever from moral causes, as we have seen in the enumeration of determining causes; but they also, and far more frequently, give rise to an exaggerated sensibility which peculiarly predisposes to nervous affections. Prolonged grief seems to have a powerful influence in developing organic diseases, especially cancer.

Mental labor, when excessive, predisposes to nervous affections; but it does not hence follow, as has been supposed, that study is contrary to nature. It is a law of nature, that the greatest possible intellectual and physical development should be simultaneously attained. The exercise of the mind, meditation and study,

are necessary to the development of the intellect, as motion is to that of the body. When the object of study suits the taste of the student, when it alternates with some manual occupation or with suitable exercise, it rather benefits than injures the health. Many literary men, physicians and mathematicians, have attained to very advanced age; and if there have been those who have died from excessive application, the number is very small. When, however, studies are continued daily for many hours, and relate to subjects in themselves uninteresting and irksome to the one employed in them, when they are not varied and interrupted from time to time by exercise, the body is injured in its development; the energy of the mental powers may be blunted, and in early youth the germ of the most brilliant faculties blighted.

Antecedent diseases may be added to these different individual predisposing causes; they strongly favor the action of those specific or occasional causes which are likely to excite anew the above named diseases. A first attack of hysteria or rheumatism not only indicates the aptitude of the patient to be thus affected, but seems to increase the tendency to repeated attacks. It has often been noticed in ulterior attacks of hysteria and rheumatism, that very slight occasional causes sufficed for the development of these affections, while the first attack required the influence of very powerful agency.

ARTICLE THIRD.

Occasional or exciting Causes.

OCCASIONAL causes, as we have stated, are those which excite disease without determining its nature or situation, and which act only with the concurrence of the predisposition.

These have not the importance which attaches to those of the first two orders; but because they do not belong to the particular history of any one disease, they are, more than the others, within the domain of general pathology: their enumeration is therefore necessary.

The impression made by very cold or very hot air, by the north or south wind; the action of a current of air upon the whole body, or of a smaller draught (*vent coulis*) upon one part in particular; the sudden passing from a very warm to a very cold apartment, and *vice versa*; a short stay in a damp house, newly built; a temporary change in the thickness or form of the garments; immersion in a very hot or very cold bath, exposure to rain; wet clothes retained upon the body; errors in diet, as the excessive ingestion of food, otherwise of good quality; the use of inferior or badly prepared food, difficult of digestion, taken at an unaccustomed hour or hastily eaten; very hot or very cold drinks, or those injurious by their quality; the suppression of

certain natural evacuations, as the perspiration, lochia, milk, and menstrual discharge; or of a morbid or artificial discharge, as that of leucorrhœa, chronic ulcers, long established setons or blisters; an habitual hæmorrhagic discharge which has become necessary; a natural evacuation considerably increased; untimely venesection; emetics and purgatives administered without indication; excessive fatigue; an unusual amount of rest; cries; singing; shouts of laughter; running against the wind; prolonged watching; physical or moral shocks; lively emotion, as joy or terror; necessary mental strife; retrocession of gout; disappearance of exanthematous affections; sudden cessation of some other complaint; such are the chief occasional causes of disease.

These differ from special and predisposing causes by not being connected with the history of any affection in particular. One occasional cause may excite any disease, and the same disease may be induced by every kind of occasional cause. If there were any doubt as to the correctness of this proposition, the examination of any treatise on pathology would suffice for its removal; in the portion devoted to the etiology of each disease, the acute in particular, all the occasional causes we have just named would be almost literally enumerated. It is quite otherwise with the determining causes; they differ either in themselves or as regards the parts upon which their action is exerted in each kind of disease. Notwithstanding this great difference between them, there are many points of contact, where the occasional, are, as it were, mingled with the determining and predisposing causes. For instance, is cold a determining or an occasional cause of rheumatism? The different opinions of physicians prove that this is a point not easily decided. On the other hand, if we compare occasional and predisposing causes, it will be seen that the same circumstances may belong to each. There is, it is true, this difference, that in the one case, the cause is momentary in its action, while in the other, that action has been of long duration; an error in diet is an occasional cause; habitual intemperance, on the contrary, is predisposing; the distinction is very marked when our examples are extreme cases, but becomes more obscure in proportion as they are less so; excesses which are prolonged for many days, for one or several weeks, can hardly be said to belong decidedly to either class. There are some circumstances where a simple error in diet, usually considered one of the occasional causes of disease, becomes a predisposing cause. During epidemic variola or prevailing plague, excessive drinking or venereal indulgence often repeated in the space of a few hours, have frequently been observed to favor the action of the pestilential or variolic virus, and the individual who for months had braved contagion with impunity, has been attacked immediately after being debilitated by these causes, which, in these cases, evidently acted as predisposants.

This division of morbid causes presents some defects; nature does not submit herself to our divisions in this instance any more

than in others; she cannot be rigorously bound by any. The proposed arrangement seems more methodical and practical than others; above all, it is particularly suitable as our guide in the study of morbid causes, considered in regard to their mode of action.

ARTICLE FOURTH.

Mode of Action of Morbific Causes.

ALL the organs of the human body are not equally exposed to the action of morbid causes; the *alimentary canal*, the *lungs* and the *skin* are more apt to receive from them an injurious impression on account of their more intimate relations with external objects. *Hufeland* in his *Pathogeny** has for this reason denominated them *atria morborum*, the *gates of disease*. To them should be added the brain and nerves, which especially in civilized man, are directly exposed to the action of a large class of morbid causes.

Among the agents which disturb the health, there are those which, impelled by a greater or less force communicated to them, or by means of their chemical qualities, penetrate into the substance of the organs; their action is purely physical or chemical; their effects would be the same upon the dead body. Among these are bodies which cause wounds, caustic substances and fire. Others influence only the living tissues, and can act only by the power of vital laws. Such are acrid plants and rubefacients, whose action is confined to the skin and mucous membranes with which they are in immediate contact; food and drink, and perhaps poisons, and certain miasmata which penetrate the system through the absorbent vessels, and whose morbid effects may be felt very far from the spot where they were first deposited; the passions, sensations and intellectual efforts which manifest themselves through the nervous system, are also of the same class.

We shall not extend farther our remarks upon the mode of admission of these causes into the system; but will proceed to point out the *modus operandi* of the three classes of causes which we have proposed.

§ I. The action of specific causes is usually evident, although not always easy, and often impossible to explain.

When a wounding instrument penetrates any part, fractures a bone, injures a tendon or an artery, we suppose the force which divided these organs to have been superior to that which preserved their continuity; we can likewise account for the disordered motions, and the flow of blood which result from such injuries. A foreign body in the trachea or bladder causes symptoms easy of

* *Παθος*, disease; *γίνομαι*, to exist.

explanation, because its action is wholly mechanical. The case is similar when the passage of alimentary matter is intercepted, where the intestines are compressed by a tumor, or strangulated by a peritoneal, or hernial stricture. We can understand likewise how a violent contraction of the muscles may cause hernia, dislocation, fracture of the patella, or rupture of a tendon; but most of the causes we have enumerated, while they exert a mechanical action upon living organs, produce other effects subordinate to the vital laws. Thus, divided or displaced parts become red, hot, painful and swollen; a new secretion is established in them, etc. There is nothing surprising to us in these phenomena, because we are accustomed to observe them. But if we desire to examine them thoroughly and to know the mechanism of their production, we are compelled to acknowledge our ignorance, unless we are willing to substitute error in its place, or veil it by language which imposes even upon ourselves. Notwithstanding the progress of modern chemistry, we are constrained to say the same thing in regard to the action of the gases which produce asphyxia. We know that some suspend gradually, and others immediately the phenomena of life; we are acquainted also with the changes caused by some of these agents in the color and consistence of the blood; but asphyxia still remains unexplained. The action of the poisons upon the economy is equally well demonstrated, but quite as inexplicable. Why is a species of coma caused by the narcotic poisons; inflammation of the stomach and intestines by the acrid, and gangrene of various parts by the septic? These are questions which do not admit of reply. We can more easily understand the effects of fire and caustics, because they are partially the same upon all organized bodies; but their peculiar action is quite as much beyond our penetration.

The action of contagious principles is yet more obscure. To a certain extent we are acquainted with the agents of which we have just spoken; we appreciate the physical and chemical properties of the *irrespirable* and the *deleterious* gases, caustics and some poisons. This is not the case with contagious principles, for they escape our senses, and those whose action is most easily appreciated, as vaccine and variolic virus, cannot be separated from the vehicle which contains them, and studied in regard to their properties. Thus it is only by a process of reasoning that we admit their existence.

Many authors have compared the development of contagious diseases to that of vegetables, and likened the contagious principles to their seeds. If we bear in mind what has previously been said of contagion, it will be easy to see the principal points of analogy between them; but the resemblance is far from complete. The existence of plants and the seeds from which they spring, is manifest and does not admit of doubt. The existence of contagious principles, on the contrary, is only admitted as a consequence of a series of facts which are thus clearly explained, and which otherwise would remain inexplicable. Certain diseases being capable

of transmission from affected to healthy individuals, this mode of transmission has been called *contagion*, and the inappreciable agent is called a contagious principle.

The action of contagious principles is obscure for many other reasons. Do they act directly upon the nerves of the part with which they are brought in contact, or are they absorbed into the rest of the system? These two opinions have been supported by quite plausible arguments; and each might be true as regards certain poisons, for it is possible that all may not obey the same laws in their manner of entering the system.

The efficacy of cauterization practised fifteen or twenty days after the bite of a rabid animal, has led some practitioners to the conclusion that the poison of rabies is not absorbed, and that being simply deposited in the soft parts which received the wound, its action is at first confined to the nervous extremities which there exist, from whence, in time, it extends to the rest of the nervous system. But in other contagious diseases, the pain, swelling, and redness which occur in the track of the lymphatic vessels and glands, seem to prove the absorption of certain poisons, although some authors have attributed these phenomena to sympathy. Admitting absorption, what is the absorbing surface, if these poisons are volatile? Is it the skin, or the mucous membrane of the air passages, into which they are carried with the air? or that of the alimentary canal where they enter mingled with the food or saliva? Some authors have supposed that contagious principles cannot act upon the membrane of the stomach, because all the substances introduced into this viscus are there digested and consequently become changed. This is an ingenious supposition; but if we remember that variola has been inoculated by mingling some of the dried scabs with the food and drink, it will be allowed that this supposed decomposition of the virus by the action of the stomach or by the gastric juice is still very doubtful. Others have asserted that contagious principles could be absorbed by those organs only in which their symptoms appeared; that variola and scarlatina were contracted by the skin, syphilis by the mucous membranes, etc.; but in the existing state of our knowledge, it is more reasonable to admit that nearly all the contagious agents may be absorbed by every surface with which they come in contact; and that being once introduced into the economy they act specially upon those organs which seem most congenial to each of them.

After having studied the action of the evident causes of disease, we shall examine in like manner the predisposing causes, commencing with aptitudes.

§ II. *Aptitudes.*

The age, sex, temperament, constitution, the degree of comfort, the healthy or diseased condition, and pregnancy, seem neither actively to concur in, nor to oppose, the production of disease. Their influence is appreciated with difficulty, but their action

cannot be doubted when general conclusions are drawn from a large number of facts. If, for instance, we collect all the observations which relate to any particular affection, and observe that, in every case, or at least in the greatest number, the disease declares itself at a certain age, and in persons of certain temperament, we must admit that these circumstances constitute favorable, perhaps necessary conditions for the development of such disease. Thus, croup is incontestably more frequent during infancy than at other periods of life, phthisis in youth, arterial aneurism and cancer in adult years, hæmorrhage and softening of the brain in old age. Females are more disposed to hysterical affections; males, to hypochondriasis; some epimedies prevail among the poor, others among the opulent, etc. In fact, the influence of aptitudes grows more obscure, as we descend from general conclusions to individual applications; for instance, it does not absolutely follow because scrofula affects children more frequently than adults, and shows a preference for the lymphatic temperament, that these two conditions have always concurred in its production, when observed in such circumstances; but this does not invalidate the fact that, generally, this age and temperament favor the affection. It is no reason because typhoid fever occurs chiefly in youth, rarely in the adult, and never after the age of fifty-five, that the season of youth has an active agency in its production, but it shows that the liability to contract it, is bounded by certain limits in regard to age, beyond which it does not pass.

The influence of age in the development of disease, is far more evident, than that of either temperament, constitution, sex, or degree of comfort. There is no disease incompatible with any temperament or constitution, or with either sex; while certain ages are exempt from some affections, and others are peculiarly exposed to them.

It is universally conceded, that of all the conditions comprised under the name of aptitudes, hereditary transmission has the greatest influence in producing disease. In some affections, indeed, it is an active predisposing cause, rather than a mere aptitude. Children of phthisical origin are in imminent peril of this fearful disease, by reason of that origin alone; and the larger proportion of them are attacked by it, however they may be circumstanced. The influence of birth is less powerful in some other diseases, as rheumatism, stone, apoplexy. Children of parents thus afflicted are, other things being equal, more liable to be affected; but other causes must often concur in order to their production, and even then they are not all attacked.

§ III. *Predisposing Causes, properly so called.*

Although usually obscure, the action of predisposing causes can often be explained in a satisfactory manner. It is easy to conceive how certain diseases, as indigestion and abortion, may be caused by too tight clothing or corsets. The disposition to plethora,

when it follows the use of very nutritious food, and anæmia, which is the effect of abstinence and poor diet, may be easily accounted for. The debilitating influence of excessive evacuations of every sort, and the tendency to inflammation which results from the suppression of habitual evacuations, is quite as clearly explained. So it is with regard to the effect of habitual repose or excessive fatigue upon the health. Nervous disease in anxious or melancholy persons, or in those who devote themselves exclusively to mental labor, is naturally connected with the causes productive of these affections. The influence of the air and the dwelling is commonly more obscure, although plausible explanations have been given in regard to it.

Predisposing causes must not be confounded with *predispositions*; the latter depend, but not constantly, upon the former. All persons are not uniformly affected by the same predisposing causes, and a predisposition to disease cannot be accurately determined by the apparent power of the causes which produced it. In one case, a slight predisposing cause will establish a very decided predisposition; in another, a number of such causes, of greater power and longer continued action, will have far less effect, or perhaps none whatever. In many instances we are compelled to acknowledge a decided predisposition to certain diseases in those who have not been exposed to any of their developing causes.

Whenever a disease appears without apparent cause, a frequent occurrence in internal pathology, we must have recourse to a *latent predisposition* to explain its production; and this doubtless consists in a peculiar modification (whose essence is wholly unknown) either of the whole system, or of one or many of its constituent parts. Thus in pneumonia, erysipelas, or articular rheumatism, it is in almost every case impossible to point out, from a consideration of the antecedent circumstances, the causes which have produced either of these affections. Great obscurity also surrounds the origin of organic diseases.

Observation shows us that, in some persons, one organ is much more frequently affected than the rest, or is even the exclusive seat of almost all the diseases which manifest themselves during an entire life, or at any rate, during one or more of its great divisions, as infancy, youth, or adult age: in one individual the lungs, in another, the stomach or intestines, in a third the brain, are, in popular terms the *feeble* organs, that is, the most liable to the action of morbid causes. The advocates of the theory of irritation proposed to call this tendency of an organ to become diseased *diathesis*,* and they admit pulmonary, gastric, cerebral and uterine varieties; but with most authors and in the usual language of science, this word has a different acceptation. Diathesis is a disposition through whose influence many portions of the body, either simultaneously or in succession, become the seats of spontaneously developed affections, identical in their nature, although

* *Διάθεσις*, disposition.

variable in external appearance. Consequently, as many sorts of diathesis must be admitted, as there are diseases which show themselves in various organs simultaneously or otherwise, by the agency of a common internal cause: this latter condition is barely admissible. If various forms of inflammation, as peritonitis, pneumonia and ophthalmia, should occur simultaneously in the same patient, each arising from evident external causes, there is no existent diathesis; but if these affections are developed without distinct cause, they are then attributed to a common predisposition, styled *inflammatory* diathesis. — Rheumatic, gouty, tuberculous, cancerous, gangrenous, herpetic, scorbutic, osseous and aneurismal diatheses, have been admitted; to these, the varicose, melanic, ulcerative and hæmorrhagic should be added.

The simultaneous development in many parts of the system, of rheumatic or gouty affections, of tubercle, cancer, gangrenous disease, herpetic eruptions, scorbutic symptoms, osseous and aneurismal tumors, varix, melanotic deposits, ulcers, granulations and hæmorrhage declares the existence of the corresponding diatheses. We admit also a granular diathesis which most physicians regard as a variety of the tubercular. Some authors mention a dropsical diathesis, which is incorrect, since dropsy is in general merely a symptom. The mucous and bilious diatheses are too ill defined for retention among scientific terms. Finally, we do not allow the purulent diathesis of some writers, because it is most frequently a mere infection; nor a syphilitic or variolous diathesis, because these diseases do not recognise an *internal cause*, but are owing to the evident absorption of a virus whose mode of action is wholly unlike that of diathesis.

A peculiar disposition exists in a few instances, which, either in the exercise of some function, or in the impression made upon it by external agents, produces phenomena wholly different from those which are observed in most persons in similar circumstances; such are the syncope caused by the sight of certain objects, or by a kneeling posture maintained for some time; and the urticaria noticed in some individuals whenever they take certain food, as strawberries and shellfish. There are persons upon whom exposure to the external air has uniformly the same effect during the cold season. *Bourdier* saw at the Hôtel Dieu of Paris, a man forty years of age, become affected with intermittent fever whenever elastic bougies were introduced into the urethra.* An exceptional predisposition must universally be admitted, through whose agency, in certain persons, like causes always produce remarkable effects. This is called morbid *idiosyncrasy*.

Predisposing and individual causes may act in unison or singly. Their energy is in proportion to their mutual action, or tendency to modify the economy in a similar manner.

Among a large population, the individual rarely agree with the general predispositions, from which it results that all the inhabi-

* *Thèses de la Faculté de Médecine de Paris, année 1809, No. 17.*

tants of a district are very seldom simultaneously attacked by disease, except it spring from a contagious principle, that is, a specific cause acting independently of predisposing causes. An affection uniformly developed by the latter, hardly ever attacks more than one third or one quarter of a population; most usually only one tenth, one twentieth, or even a less proportion. We can sometimes be certain, that those attacked by the prevailing malady, are those in whom the influence of general predisposing causes has rendered more active that of the individual predisposing causes. When, for instance, bilious affections are very common, persons of bilious temperament, who live chiefly on animal food, etc., are more often attacked, while the sanguine or lymphatic, being less impressible by general predisposing causes, possess a resisting power in their very constitution. Thus, other things being equal, the latter are more rarely and less severely affected, while the former are more generally attacked and with more violence and rapidity. There are, however, many exceptions to this rule.

1. Individual predisposing causes are sufficient of themselves to produce most diseases. There is no affection which may not be occasionally developed in isolated individuals, independently of general predisposing causes. Angina and pneumonia, for instance, although more frequent in certain seasons, may occur in all, through the influence of individual predisposing causes only. Often, while certain diseases prevail under the influence of general causes, individual predisposing causes develop affections of a wholly different nature. It is in this way that inflammatory diseases may appear in certain persons inhabiting places where dropsy and scurvy are endemic.

2. On the other hand, general predisposing causes, when exceedingly active, may exert an influence independently of the individual predisposants, and even notwithstanding the resistance they offer. Thus it is that diseases developed during public calamities, as famines, sieges, etc., fall upon all classes of society, almost without distinction; neither is any temperament or age exempted, as has been observed in many epidemics, particularly at Modena* and Naples.†

As regards their relative energy, then, we find that general predisposing causes may neutralize the effect of individual causes, and bring on diseases entirely in opposition to the latter, and *vice versa*.

Before concluding what we have to say of predisposing causes, we remark, that if there be certain conditions which dispose to disease, there are likewise many which are preservative of health. Without mentioning in this connection that unknown power called *vital force*, which, as has been said, appears to struggle incessantly against the destructive agents which surround us, there are condi-

* RAMAZZINI, 1690 - 93.

† SARCONE, 1764.

tions which exempt us from certain affections; habit, in particular, is one of these. By it the most indigestible articles of food are partially deprived of their injurious effects, and the pernicious energies of the most subtle poisons destroyed; the Turks use opium with impunity, and Mithridates, according to historians, became insensible to poisons. We must not suppose, however, that the daily use of deleterious substances has no injurious effect upon the economy; habit does not wholly free us from their action; it merely alters and strikingly enfeebles it.

The power of certain contagious principles seems to be exhausted in like manner by the force of habit. In places where yellow fever is endemic, the inhabitants are not attacked by it, as at Havana and Vera Cruz, for instance. The Turks resident at Constantinople seem to be as much habituated to the principle of the plague, which is in almost continual action in some parts of the city, as they are to opium by daily use. We may with as much propriety conclude that if the visiting physicians of hospitals are not more frequently than others the victims of typhus when widely epidemic, it is because they have become accustomed to the action of the contagious principle before it has acquired its full power.

The force of habit goes yet farther, and deprives even chemical agents of a portion of their influence over living tissues. There are those who handle with impunity bodies at a very high temperature, as burning coals, or iron bars whose opposite extremity is incandescent; others have accustomed themselves to swallow boiling liquids without any sensible inconvenience. Tartra relates the curious fact, that a woman given to intemperance, had passed from the immoderate use of wine to that of brandy, then of alcohol, and even of ether; at last, unaffected by these liquids, she finished by drinking nitric acid, without experiencing from it any remarkable injury.*

It is hardly necessary to add, that age, sex and temperament are all conditions which should be considered preservative against certain affections. Primitive scirrhus or aneurism are never observed in infancy; one instance only of croup is recorded in old age.

We have already seen that some contagious diseases attack the same person but once during life; those who have been affected, are consequently exempt. A very extraordinary, although very well known phenomenon, is the reciprocally preservative property of variola as regards vaccinia, and *vice versâ*. This fact which is unique in the history of contagious disease, naturally leads us to suspect a similarity of origin in these affections.

Finally, there exists a fortunate disposition, whose nature is unknown, but whose effects are appreciable, which protects from certain maladies. There are some individuals who appear to be insusceptible of the contagion of variola, or vaccinia. Others expose themselves daily to syphilis with impunity. In all the instances of epidemic typhus or yellow fever there are some who

* *Empoison. par l'acide nitr.*, p. 124.

brave the contagion and escape the disease. When the plague was at Marseilles, the venerable Belzunce, patriarch of the city, was not affected by it, although almost constantly among the sick, aiding them in every manner. In the black plague which desolated the south of France, in 1347, another fact, no less remarkable, was noticed; of thirty-five monks who dwelt in the monastery of Mont Rieux, one only escaped the contagion; this was Gérard, brother of the celebrated Petrarch, who took care of all the brethren and also buried them.

§ IV. We have considered the mode of action exhibited by specific and predisposing causes in developing disease; it remains for us to notice that of the occasional causes. The influence of the latter is not by any means so great; they act only when there exists a predisposition. Thus, of ten persons who may commit an excess of the table, or who may be exposed to cold, etc., there will be, at farthest, but one or two whose health will be disturbed, and sometimes out of a larger number there will be none affected. Moreover, these causes have no influence upon the sort of affection which is developed; the same occasional cause may, as we have seen, excite any disease, and the same disease may result indifferently from any occasional cause. Such a cause is, as it were, a shock given to the system; it does not affect those in firm health; in others it may develop any affection whatever.

Such is the mode of action of each kind of morbid causes. There is a certain number of diseases in whose production some of these three classes of causes concur; there are others where the disease arises exclusively from a specific cause, or from one or more predisposing causes. Asphyxia always depends on a specific cause; typhus requires the influence of some predisposing cause in the majority of cases; and sometimes an occasional cause, as terror, or too strict diet, may excite its attack; plethora and inflammatory fevers are almost always exclusively produced by predisposing causes; no affection arises solely from an occasional cause.

The knowledge of causes is not absolutely necessary in particular cases. When the disease is due to specific causes, they are easily appreciated, but the predisposing causes, which are usually obscure, frequently escape the physician's sagacity. The kind of disease developed, may in some cases lead to the suspicion of the causes which have produced it, and serve as a guide in the search for them; but in many other instances these causes remain uncertain, or even unknown. In respect to occasional causes, as they are immediately antecedent to the disease, they attract more particularly the patient's attention, which cannot fail to instruct the physician; but a knowledge of them is generally of slight importance, and many diseases make their appearance without their influence.

ARTICLE FIFTH.

Division of Diseases relatively to the Causes which produce them.

DISEASES arising under similar conditions, or which offer certain points of resemblance as respects their causes, have been grouped together and possess certain interesting relations. The principal groups to which this etiological division has given rise are those of innate and acquired, sporadic, endemic and epidemic diseases.

By *innate* or *congenital* diseases (*morbi cognati, congeniti*) is understood those exhibited by the child at birth. They are not all hereditary, neither do all hereditary diseases appear at the time of birth. The latter have existed, or are still present in the parents, and this does not necessarily occur in regard to the former. An affection may be both hereditary and congenital.

Under the title *acquired diseases* (*morbi acquisiti, adventitii*) are included those not commencing till after birth and independent of hereditary disposition. All diseases may come under this head except deformities.

Sporadic diseases (*morbi sporadici**) are those which attack a single individual, or a certain number of isolated persons. They depend especially upon the predisposing causes; for the epithet sporadic is not given to affections induced by specific causes. We do not say that wounds, fractures, and asphyxia are sporadic; this term is applicable only to those diseases whose development is apparently spontaneous. Sporadic diseases are, of all, the most common; they appear at all seasons, at every age, and in all climates, under the action of individual causes.

Diseases which attack a mass of individuals at once, have been styled *pandemic* (*morbi populares*); these have been subdivided into several series, according to the circumstances which accompany their development. Those which appear every year at nearly the same time, are called *annual* (*morbi annui, anniversarii*); those which manifest themselves uninterruptedly for many seasons, or one or more years, are known as *stationary* (*morbi stationarii*); those occurring at various seasons, and modified only by prevalent affections, are termed *intercurrent* (*morbi intercurrentes*). At the present time these names are generally abandoned, and two classes only of popular diseases are admitted, endemic and epidemic.

Endemic † diseases (*morbi endemici*) are those produced by the concurrence of causes constantly or periodically in operation in certain situations, so that the diseases resulting from them are constant, or at any rate, appear at fixed periods, affecting, in every

* Σπείρω, to scatter here and there.

† Εν, in; δῖμος, the people.

instance, a greater or less proportion of the population; such are goitre and cretinism in the Valley of the Rhone, and intermittent fever in most marshy districts.

*Epidemic** diseases, (*morbi epidemici*) which, like the former, attack a large number of persons simultaneously, or become far more frequent than they usually are, have a limited duration, and do not appear at regular intervals. Their causes have ever been the object of research to the observing physician. Nearly every one is ready to acknowledge that most epidemics do not depend solely upon the circumstances which surround the inhabitants of an infected district; and that the action of a succession of causes for a variable space of time, has prepared the way for their manifestation, and produced a predisposition which the actual causes have only developed or increased. It is also observed in many epidemics, that those who have been resident for a short time only in the region where they prevail, escape them, while the older inhabitants are attacked. Some have sought for the causes of all epidemics in the food and drinks, but especially in the sensible qualities of the atmosphere. Others having noticed that the changes sometimes occurring in the atmosphere during an epidemic, do not always sensibly influence its course, have concluded from this, that the exciting and continuing causes of prevalent diseases do not exist in the *appreciable* qualities of the air. They have thus been led to admit hidden qualities in this fluid, to which they attribute the diseases, whose occurrence cannot be explained by the *sensible* changes of the atmosphere. From this arises the doctrine of *occult* causes, admitted under various titles, by very celebrated and highly judicious physicians, from *Hippocrates* to *Sydenham* and *Mertens*.

Nothing was better suited to throw light upon this question, than the numerous epidemic constitutions, published within two centuries. It was thought that a constant relation would be recognised between epidemics and the conditions under which they manifest themselves, by means of a careful comparison, for a series of years, on the one hand, of the various states of the atmosphere and the other general morbid causes; on the other, of the diseases developed under their influence: this is the object of epidemic constitutions. The result, however, has not answered the apparently well founded expectations formed in regard to this undertaking, either because the epidemic constitutions were not properly observed and described, or because epidemics depend upon causes which have hitherto escaped our means of investigation.

Without giving a decided opinion upon so obscure a question, we shall remark, that among the hitherto described epidemics, there are some which seem to have fixed appreciable causes: of this number are those of Lausanne, Modena, Gottingen and Genoa; but we must still remember that a concurrence of causes resembling those already cited, would not necessarily produce like effects;

* *Επὶ*, upon; *δῖ' ἄνθρωπος*, the people.

and that by far the greater number of epidemics cannot be ascribed to any known causes, notwithstanding the great pains that many physicians have taken to indicate every circumstance which preceded or accompanied their development.

Among widely prevalent diseases, there is a certain number arising from contagion or infection, which must not be confounded with the rest, although the majority of writers have included them under the common denomination, *epidemic diseases*.

It is not always easy to determine whether a disease which attacks many persons simultaneously, be owing to general predisposing causes, or to a contagious principle. It may happen * that a disease is really contagious while it appears only epidemic, because contagion does not affect all who are exposed to its influence, or because the vehicles of contagion and the contagious principles being almost infinite, persons may be affected who thought themselves removed from all communication with the sick; and again, some other affection, considered contagious, because it attacks individuals who are in communication, may be dependent upon epidemic influence, which is common to all. Thus when many persons occupying the same house, fall ill simultaneously or successively, contagion is nearly always suspected; yet, as *Ramazzini*† remarks, it is natural that a number of persons exposed equally, and for the same length of time, to the influence of the same causes, should be attacked, at a nearly identical period, with the same disease. A sort of *maturity*, says this distinguished physician, supervenes in the system when exposed for a certain time to the action of similar morbid causes.

In certain instances, the difficulty of lulling all suspicion of contagion, hinders us from wholly denying its action; and in others we cannot admit it, from not being sure whether the disease is ascribable to the state of the atmosphere, or to some other general cause.

The more volatile and easy of transmission the contagious principle, the more obscurity surrounds it.

Another circumstance which renders the distinction more difficult is, that the majority of contagious diseases attack a population only while contagion is favored by a peculiar condition of the atmosphere, or by other general predisposing causes to which the prevailing malady might be attributed. Finally, contagion sometimes loses its activity after a time, and from observations at such periods, we are led to suppose that the affection is not contagious. This has been remarked in most of the pestilential diseases, particularly in the typhus of Europe, and the plague of the East. We should find it difficult to conceive of their gradual cessation, if this principle be not admitted.

There are, nevertheless, certain circumstances which serve to distinguish contagious from epidemic diseases: among these are *inoculation* and *importation*. Whenever a disease is clearly capable

* TOMMASINI. *Fièvre jaune*.

† *Epidem. Modène*.

of transmission from the affected individual to the healthy, and this transmission has been recognised in repeated instances, contagion can no longer be doubted. It is in this manner that the contagious nature of variola and vaccinia has been clearly proved.

The impossibility of transmitting a disease by inoculation, has been considered a negative means of forming an opinion as to contagion. During the prevalence of epidemic cholera, many courageous and devoted physicians inoculated themselves with the matters excreted by the sick, with the intention of throwing light upon this question, whose solution was so important to society. While we award to their zeal the praise due to the honorable motive which directed them, it must be asserted that these experiments were not sufficient to fully settle the question. All diseases are not similarly contagious; many have a peculiar mode of transmission, out of whose limits contagion does not manifest itself. Thus syphilis is rarely contracted except by coitus; nor the vaccine disease, except by the artificial insertion of the liquid contained in the pustules. The same may be true of certain other affections; and the virus of Asiatic cholera, if it exist, might require, in order to transmission, a different mode of inoculation from those hitherto tried. In addition, as we have elsewhere remarked, every individual is not prone to receive the contagion; many more cases, also, are needed, in order to solve the question, and in trials of this kind, negative have far less influence than positive results. Finally, it should be remarked, that the development of a disease in those who have been subjected to inoculation, cannot prove its contagious nature, except the inoculation be practised at a distance from the place where the affection prevails. Thus, whatever may have been the results of inoculations which took place during the epidemic cholera, and in the regions where it raged; they were, from the very first, of no value.

Importation, is, in this class of cases, the most suitable means of explaining these questions. When a disease previously unknown in a country, suddenly makes its appearance there; if its manifestation succeed the arrival of a number of strangers who may be then affected with it, but recently cured, or who come from a place where it prevails; if those who receive these strangers and provide for them, are the first to be attacked by the disease; and if it next appear among the individuals who live with those first affected, it is evidently contagious. It is in this manner that the appearance of variola at the Cape of Good Hope, in the Faroe islands and in many parts of Russia, where it was previously unknown, would prove, if it were necessary, the contagious nature of this disease. The importation of scarlatina into Podolia,* as

* *Hildenbrand* thus speaks in regard to this subject: "A black coat which I wore when visiting a patient affected with scarlet fever, and afterwards carried with me from Vienna into Podolia, without having it on for the space of one year and a half, communicated to me this contagious disease upon my first arrival; from me it spread in the province, where it had until then been almost unknown." — (*Du Typhus Contagieux.*)

related by *Hildenbrand*, establishes, in like manner, its contagious qualities. If the importation of the plague, of yellow fever, or of Asiatic cholera were absolutely proved, it would leave no doubt as to the contagious nature of these diseases. But in the present state of our knowledge, these delicate questions are yet undecided. Many good observers are convinced that these diseases, arising in the first place from miasmata, are transmitted more particularly by the accumulation of the sick; and that consequently they are *infectious*. It should be added, that any disease arising from a crowding of patients, and infectious in its origin, may become *contagious* in its future transmission. Camp fever and hospital gangrene are striking examples.

Upon this subject we shall offer one final remark, viz. It is not in large cities that the question of contagion can be advantageously studied and thoroughly examined. In a place where six or eight hundred thousand inhabitants are congregated, unknown to each other, it is impossible to follow in its transmission, the most evidently contagious disease. The course of variola at Paris may be cited as an example, and the impossibility of arriving, in the majority of cases, at a knowledge of the period and source of its transmission. On the other hand, in places where the inhabitants are fewer and better acquainted, it is usually easy to follow the propagation of a disease; all know who were first attacked by it, what other persons have been successively affected, and what communication they held with those first diseased. On this account, villages, and not populous cities, are the places where the mode of propagation of diseases can be advantageously studied, and their contagious, infectious, or merely epidemic character, most correctly appreciated. We do not, in this connection, speak of syphilis or vaccinia, which cannot be confounded with epidemic diseases, since they require close contact in order to their transmission.* We shall conclude by calling to mind this ancient precept, too often combatted in our day, that whenever there is uncertainty in regard to contagion, it is the physician's duty, as also that of the acting authorities, to proceed as if it were proved. There is, doubtless, serious inconvenience in declaring contagion to exist where it does not in reality, but there is still greater in mistaking it when really present.†

* According to many authors, (and the opinion is supported by certain historical facts,) it would appear to be proved that syphilis, at the period of its first appearance, presented as ready a contagion as the plague or variola, and that, in course of time, it became less and less active. No other contagious affection has presented analogous changes in its mode of transmission.

† This motive would have sufficed to induce us to rank yellow and typhus fever among the contagious diseases, even if we had not been convinced, as we are, of their contagious nature. [The author ranks himself with the very small number of those in favor of the contagious nature of yellow fever: the best observers of the present day are decidedly opposed to the doctrine of contagion. *Grisolle*, in his work on Internal Pathology,¹ makes several assertions which

¹ Path. Int., Vol. i, p. 77, Deuxième Edition. *De La Fièvre Jaune.*

Diseases have likewise been divided, in respect to their causes, into *essential*, *primitive*, or *protopathic*,* and into *symptomatic*, *secondary*, or *deuterothatic*.† The first are the immediate result of morbid causes; the second depend upon another affection, of which they are, properly speaking, but a symptom. Hæmorrhage belongs occasionally to the latter, sometimes to the former. They are essential, when not connected with *perceptible* lesion of the organ where they are seated; they are symptomatic in scorbutus, and many organic affections.

It is sometimes easy to determine, whether a disease is primitive or secondary: thus, when cancer of the uterus has attained a certain stage, the sanious discharge cannot be mistaken for uterine catarrh, and the hæmorrhage, which comes on at intervals, cannot be considered as primitive; but it is otherwise when the same disease is only commencing, and the neck of the uterus does not yet present the hardness and deformity which characterize the disease.

There is a certain number of affections which, however well marked they may be, are essential according to some authors, and are considered symptomatic by others; among these are curvature and softening of the bones, regarded by some physicians as primitive diseases, while others look upon them as secondary, and connected with scrofula. The intestinal ulcerations in typhoid fever, and the enlargement of the spleen in intermittent fever, are likewise of this class. Dropsy and the neuroses have been, and still are, at least in some of their forms, subject to similar diversity of opinion. Exact observation and thorough discussion have decided some of these questions, and time will gradually lead to the solution of many others.

ARTICLE SIXTH.

Lapse of Time between the Application of Causes and the Development of Disease.

A CERTAIN number of diseases are produced at the moment when the action of their determining cause takes place; this is

seem sufficiently positive in regard to the truth of the opinion of the non-contagionists; he mentions the names of Chervin, Dalmas, Devèze, Valentin, and Rush, as among the principal supporters of the latter doctrine. The work of Chervin is pronounced by the accomplished editors of the American edition of Marshall Hall's Theory and Practice of Medicine, to be the most elaborate investigation of the point in dispute;¹ and certainly, if we consider the time devoted to his undertaking, and his unwearied researches both in Europe and America, his opinion is entitled to our very highest consideration. Five hundred Spanish and American physicians out of six hundred, coincided with him in favor of non-contagion. — TRANS.]

* *Πύθος*, disease; *ἰδιος*, proper; *πρώτος*, first.

† *Πύθος*, disease; *δεύτερος*, secondary.

¹ Prin. of the Theor. and Practice of Med. By M. Hall. American Edition, p. 275. Yellow Fever.

observed in contusions, wounds, fractures, and the inspiration of certain deleterious gases. The inflammation resulting from the application of rubefacients is usually manifested in a short time, as an hour, for instance; the action of vaccine virus commences at the end of three days; the first symptoms of variola are not evident, generally speaking, till eight days from the period when the contagion took place; syphilis is not developed in some instances for three or four weeks after connection, and usually the first symptoms of rabies do not declare themselves in adults before the thirtieth or fortieth day after the bite.

The time which elapses between the application of contagious principles and their first effects upon the economy, has by many authors been called the *period of incubation*.

It is almost always impossible to ascertain accurately the time since which the predisposing causes have acted: some of these causes are inherent in the constitution of the individual, as age, sex, temperament, etc. The development of disease follows immediately, or at any rate, very closely, the application of occasional causes. — M.

CHAPTER VI.

PRECURSORY PHENOMENA. — PRELUDES. — ANTECEDENT SIGNS. — PRODROMES OR IMMINENCE OF DISEASES.

ALL those phenomena which are exhibited from the moment when the healthy action of the functions begins to be disturbed, up to the time when the disease commences, are styled *precursory* or *antecedent signs*.*

Diseases are not invariably ushered in by precursory phenomena; the transition from perfect health to illness may be sudden. Those affections which are produced by specific causes never have any prodrome, even when they arise from contagion. The sneezing which precedes the eruption of rubeola, the vomiting which occurs previously to that of variola, cannot be considered as precursory phenomena; they are the first effects of the action of the peculiar virus of these two affections, and the disease has already commenced, although the eruption be not apparent. Preludes do not take place, except the affection be owing to predisposing causes; none are observed in chronic diseases.

The precursory phenomena have not, generally, any analogy with the malady about to be developed, and cannot lead us to suspect its nature. Those of almost all diseases strikingly resemble

* *Πρό*, before; *δρόμος*, course.

each other, and those of the same affection are scarcely ever similar. When, however, an epidemic prevails, it may be announced by phenomena which are uniform in a large majority of cases, and from this the physician recognises, or at least suspects, the kind of affection about to appear. But, in most instances, the prodrome cannot lay the foundation of any decision, nor even of reasonable conjecture.

The precursory phenomena of acute diseases are exceedingly varied and numerous. We shall mention those most usually observed.

The attitude indicates an unusual languor, the step loses its ordinary firmness, there is progressive loss of flesh, the expression of the countenance is slightly altered, in a manner appreciable only by those familiar with the individual; the face is either pale, or pale and flushed alternately; the least exercise causes fatigue; slight flying pains, variable in their seat and nature, are experienced in different parts of the body, particularly the head; transient disturbance of the senses of sight and hearing occurs, as dimness of vision, and tinnitus aurium; the moral impressions are either increased or diminished; presentiments of misfortune and inability for mental exertion, disturbed sleep, its entire absence, or a slight degree of somnolence, are frequent precursory phenomena of diseases. The appetite is usually diminished, rarely heightened or perverted; the mouth is often clammy or bitter, the thirst increased, the breath fetid, digestion difficult and slow, and the bowels less regular. The slightest exertion causes breathlessness; at intervals, sighing, groaning, yawning, stretching, and occasionally, repeated fits of sneezing are noticed. Palpitation, syncope, sensitiveness to external cold, the unequal distribution of heat, a dry skin or transient perspiration, a paler or deeper color of the urine and inaction of the genital organs, announce the approaching invasion of an acute affection.

In other cases, illness is preceded by entirely opposite phenomena; the functions, far from being enfeebled, seem exercised with more than ordinary vigor; the countenance is flushed, the strength increased, the intellectual faculties more active, appetite and digestion are more powerful; the individual congratulates himself upon his increased health, which is but a precursor of disease.

Certain other phenomena have been observed while disease was still latent; one patient experiences a sensation which may be compared to that caused by a breath of wind lightly fanning the surface of the body; another, a sort of shock similar to that caused by electricity. Finally, to these phenomena should be added the changes supervening in the pre-existing diseases, in the secretion from wounds or ulcers, cauteries, blisters, in the appearance of exanthemata, etc. It is not uncommon to observe at such times a more or less complete absorption of the serosity infiltrated into the cellular tissue.

Such are the principal phenomena which precede acute diseases.

They may be variously grouped and combined. Each of them may exist separately. They are never all present in the same individual.

The duration of the precursory period is very variable: occasionally a few minutes, sometimes a number of hours; it may continue many days or even weeks, but rarely longer. When it has been long, a grave disease may be apprehended, there are, however, numerous exceptions to this rule.

When the intensity of the precursory phenomena augments progressively, they may gradually become confounded with those of the disease, and likewise with the occasional causes which excite its appearance; a chill, an attack of indigestion, the suppression of an habitual evacuation, the desiccation of an issue, are at one time the causes, at another the first effects of the disease.

The intensity of precursory phenomena cannot convey an accurate idea of the gravity of the affection which they announce. The prodrome of some very severe, and even fatal diseases, may be hardly perceptible; while certain mild affections are sometimes preceded by inexpressible anxiety and other very alarming signs.

The same phenomena which precede diseases may be manifested without any subsequent illness; they cease suddenly, or gradually disappear, and the functions resume their usual regularity.—M.

CHAPTER VII.

SYMPTOMS,* OR SYMPTOMATOLOGY.

A SYMPTOM is any change perceptible to the senses, occurring in any organ or function, and connected with the existence of disease.

Symptoms should not be confounded with phenomena or signs.

A *phenomenon* is any act or change effected in the healthy or diseased body, whereas, a symptom is alone observable in the latter. Where there is no disease, there can be no symptom. Galen justly remarks, that the symptom follows the disease, as the shadow follows the body. Hence, the impropriety of the terms *precursory* and *consecutive symptoms*, employed by many authors; whatever is observable previous to the existence, or after the termination of a disease, is a phenomenon, not a symptom.†

It is equally important to distinguish between the symptom and the *sign*. A sign, in the common acceptation of the word, is any

* Συν, with, at the same time; πῖπτω, I fall.

† Λογος, discourse; συμπτωσις, symptom.

circumstance, by which we become acquainted with that of which we were previously ignorant. In medicine, is understood by this word, whatever reveals anything relating to the past, present, or future state of a disease. The causes which preceded its development, its mode of attack, its progress, and the effect of therapeutical agents, all afford signs as well as symptoms. The symptom is simply a sensation, which a special effort of the mind is alone able to convert into a sign. While the latter, therefore, relates to the judgment, the former is referable to the senses. The symptom is recognizable by every one, the physician alone detects the sign in the symptom. As there are no symptoms which may not furnish some sign to the physician, and moreover, as signs occur in health as well as disease, it has been said, that "every symptom is a sign, but that all signs are not symptoms." By what means symptoms are converted into signs will be seen hereafter: the former claim our present attention.

Symptoms, or the appreciable changes effected by disease in the various organs or functions, are very numerous. It is important that some method be adopted in their exposition, by means of which, those between which the greatest analogy exists, may, as far as possible, be grouped together. Several methods have been proposed, which offer this advantage to a greater or less extent. Among these may be mentioned the division into those symptoms appreciable to the physician, and those perceptible to the patient; that also of *Boerhaave*, who divided them into three series, according as they depend upon disorder of the functions, excretions, or qualities of the body; and finally, that recently proposed by *Bayle*, our former instructor and friend, who divided them into *vital* and *physical*: the former, which are solely dependent upon functional disturbance without any appreciable organic lesion, and which disappear entirely at death; the latter, on the contrary, which consist in an appreciable change in the parts themselves, and continue after death. It will be at once evident, that this distinction had special reference to pathological anatomy, and was entirely inapplicable to the methodical exposition of symptoms. That proposed by *Boerhaave*, makes too wide a separation between things which are nearly connected; the secretions, for example, are separated from *secreted matters*, and the *qualities* of the body from the functions to which they belong.

Another equally important point, is the adoption of some order which may be advantageously applied to the history of each affection, and to the examination of each particular patient. There are many highly commendable practitioners, who at the bedside, examine in succession all the functions, the organs of which are situated in the head, neck, chest, abdomen, and limbs; this method, which it would be difficult to employ in the general exposition of symptoms, would not present in the examination of individual patients, the same advantages, which might be obtained from a different one. It approximates things the most unlike, and widely separates those, between which, the greatest analogy exists.

The various disorders of the digestive organs, for example, instead of being successively and uninterruptedly examined, are separated from each other by so many intermediate questions, that it becomes difficult to discover the connection between them. The same may be said of the circulation and locomotion, the organs of which extend throughout the economy, and of many other functions.

A more natural method is to examine successively all the arrangements which each function presents, in whatever part of the body the organs which concur in its performance are situated. This method, which is equally convenient in the examination of the patient, and in making a record of the disease, is the only one applicable to the particular description of each affection, and to a general exposition of symptoms.

But what order should be pursued, in the examination of the functions? It would be desirable if that could be adopted, which is generally followed in the study of physiology; examining in succession the functions of assimilation, those of relation, and lastly, those of generation. As, however, this division does not present the same advantages in the study of the diseased, as in that of the healthy body, we think it unnecessary to confine ourselves strictly to it.

That which strikes the physician, in first accosting a patient, and from which he draws his first conclusions respecting the nature of his disease, is the physiognomy, attitude, movements, and voice: here, then, we should naturally commence our examination of symptoms; it is, moreover, at this time that the changes which have taken place upon the exterior of the body, are more justly appreciated. If this first sensation be neglected, the eye gradually becomes accustomed to whatever is unusual in the physiognomy of the patient, and the physician is rarely able, after remaining with him for a time, to judge with the same accuracy as he would have done at first. The same is true of the movements and voice; it is therefore better to commence the examination of patients, and the general exposition of symptoms, with the functions of relation, afterwards passing successively to those of assimilation and generation. We shall pursue the following order, in the exposition of the symptoms which belong to each of these three great series.

1. Exterior of the body.

Locomotion.

Voice and speech.

Sensations.

Affective functions.

Intellectual functions.

Sleep and the waking state.

2. Digestion.

Respiration.

Circulation.

Heat.

Secretions.

3. Generative functions in the male.

Generative functions in the female.

ARTICLE FIRST.

Symptoms furnished by the Functions of Relation.

IN order to the just appreciation of the changes effected by disease in the various functions, and particularly those of relation, it is important, if not indispensable, that the physician be familiar with the physiognomy, attitude, gestures, and voice of persons in health. Without this fixed point of comparison, he will be unable to arrive at more than approximate results, in his appreciation of the phenomena which fall under his observation.

SECTION FIRST.

Symptoms furnished by the Exterior of the Body.

THE symptoms which may be presented by the exterior of the body, are of the highest importance. Having first considered those presented by the body as a whole, we shall pass to the consideration of those which may be furnished by each part respectively.

§ I. The *exterior of the body*, considered generally, comprises the attitude, volume of the body, firmness of the flesh, color of the skin, eruptions, *plicatures*, tumors, and solutions of continuity of every kind. To these might be added, the heat and moisture of the skin, pulsations of superficial arteries, distension of veins, &c.; but these will be more naturally considered elsewhere.

A. In health, the attitude in the waking state is free and unconstrained; during sleep, the limbs are usually demiflexed, and the body inclined to one side, commonly the right. In disease, the *attitude* varies more or less from these conditions.

If the patient be up, an unusual degree of languor is observable in his attitude; in some cases, as in maniacs, for example, an unnatural degree of strength and assurance is noticed. There are some diseases which are at once recognizable from the position of the patient; as catalepsy, for example, from the general immobility; St. Vitus' dance, from the irregularity and continual succession of motions; hemiplegia, from distortion of the features, and a change in the position and motions of the limbs, and opisthotonos and emprosthotonos, from the convulsive flexion of the body backward and forward.

When in bed, some patients assume various postures, and retain them for a time; others are constrained to remain in the same position, a symptom not without importance. Thus some patients lie constantly upon the back, (*decubitus dorsal*) either from debility, which occurs in adynamic fevers, or from difficulty or pain

experienced when in any other posture, as is the case in general rheumatism, and acute peritonitis. Others, from the nature and violence of their pains, are compelled, at least for a time, to lie *upon the abdomen*, as in saturnine, nephritic and hepatic colic, and in some cases of delirium. At times the patient lies upon one and the same side, (*decubitus lateral*) in consequence of effusion into one of the pleuræ, inflammation of one lung, or an acute pain on either side; in cases of effusion or hepatization the patient lies upon the affected side, and upon the opposite side when suffering from acute pain. There are however numerous exceptions to these rules, the dorsal decubitus being the posture most frequently observed in cases of pleuritic effusion, and single pneumonia. Lastly, in certain thoracic affections attended with difficulty of respiration, and particularly in cardiac aneurism, in double hydrothorax, and in the paroxysm of dyspnœa occurring in pulmonary emphysema, the patient is compelled to sit up in bed, it being impossible for him to retain the horizontal position; he is even in some cases obliged to bend forward, in order to create a support, allowing the legs to hang down. In some affections of the air passages, the patient retains the sitting posture, with the head thrown backward. In compression of the trachea by a tumor, particularly if it be an aortic aneurism, the patient is constrained to assume a fixed and often strange attitude, this position doubtless partially relieving the pressure upon this organ, and thereby rendering respiration less difficult. In other diseases, instead of being constantly confined to one position, the patient is obliged to change it continually. This state of *restlessness* (inquires) is particularly observable in inflammations of the abdomen, and at the commencement of eruptive fevers.

B. The body becomes increased or diminished in *volume* in many diseases.

A slight increase of volume occurs in febrile heat, and in the second stage of intermittent fever; while in the first or cold stage diminution takes place. Plethora produces an analogous effect, appreciable in the face, hands, and particularly the fingers, which are with difficulty flexed. A more marked tumidity occurs at the commencement of the exanthematous diseases. But where considerable increase of volume exists, it is almost always owing to an accumulation of fat or serous fluid in the cellular tissue, and is sometimes caused by the passage of air between its lamellæ.

The accumulation of fat, and the consequent increase in the volume of the body, have been rarely observed in disease. They may occur in certain local affections, which compel the patient to abstain from exercise, and in which a subjection to regimen is unnecessary. This accumulation, when considerable, is itself a disease, which has been designated by the term *adipose polysarcia*.

Increase in the volume of the body when occurring in disease, is almost always owing to infiltration of serum into the interstices of the cellular texture. This infiltration, when general, is called

anasarca * or *leucophlegmasia*, † and when partial, *œdema*. ‡ It is known by the paleness and semi-transparency of the skin, and by its *pitting* on pressure of the finger. This depression however, to be perceptible, often requires that the finger be passed lightly over it, when it is at once felt. Œdematous swelling may be more easily recognized, when the disposition of the skin allows us to pinch it between the fingers. Incipient œdema may be often thus distinguished in patients confined to their beds, on the internal surface of the thighs; in those who are up, œdema first shows itself around the malleoli, particularly towards evening.

The infiltration of air into the cellular tissue, is called *emphysema*. || It occurs in penetrating wounds of the thorax, and in diseases in which the continuity of the air passages is destroyed: it is owing in both cases to the introduction of air into the interstices of the cellular texture. That which occurs in gangrenous affections seems to depend upon the rapid decomposition of parts already deprived of life. The insufflation of air into the cellular tissue produces *artificial* emphysema. Can we admit with some authors, the existence of *spontaneous* emphysema, produced by exhalation of gas into the cellular tissue? Without pretending to assign a limit to *possibilities*, we are of opinion that in the present state of the science, such exhalation cannot be certainly proved. Emphysema, whatever be its origin, is easily recognized, particularly in gangrenous diseases, by the crepitation produced by pressure upon the tumified parts, by the softness and elasticity of the distended integuments which readily yield under the finger without preserving the impression, and by increased resonance.

Diminution in the volume of the body is a very frequent phenomenon in disease. It may in the course of a few days, and even a few hours, become considerable, as after one or two paroxysms of malignant intermittent fever, or after excessive alvine discharges, as was observed by Morgagni on his own person, in an attack of serous diarrhœa, and as we have ourselves frequently remarked in Asiatic cholera; but it usually takes place slowly, constituting *emaciation*, which may exist in different degrees from simple emaciation, to *marasmus*. § In most acute diseases, there is little diminution of volume, unless they be prolonged or accompanied with abundant evacuations, or treated by artificial evacuants, as bleeding, purgatives, &c. With these exceptions, emaciation does not become very apparent in acute affections till the period of convalescence. It is particularly in chronic diseases that it becomes considerable, and in such cases is always indicative of great danger.

C. During the period of growth, in the course of acute and

* Ἄνα, in; σαρκίς, flesh.

† Λευκός, white; φλεγμασία, inflammation.

‡ Οίδημα, swelling.

|| Εμφύσω, I inflate.

§ Μαραίνω, I dry up.

chronic diseases, increase in height is sometimes observed to be far more rapid than ordinarily takes place in health. This sudden growth is generally a suspicious sign.

D. *The firmness of the flesh* demands attentive consideration in diseases. *Huxham*, and many other distinguished physicians, have attached due importance to this symptom, with reference to the appreciation of the strength, in acute diseases. It is preserved and even augmented in most inflammatory affections; and is sensibly diminished in diseases of debility. *Flaccidity* of the flesh is particularly noticed in the adynamic diseases.

E. *The color of the skin* varies according to the climate, sex, age, habitual occupations, &c.; there is however a *tint peculiar to health* which is familiar to every one. There are some slight affections in which the color of the skin remains unchanged; but in nearly all grave diseases, there is a perceptible change in the natural color of this membrane.

The skin is *pale* in the cold stage of intermittent fevers; and in cases of scrofula, chlorosis, anemia and in certain species of dropsy, it also has a semi-transparent appearance. It is *sallow* and encrusted, as it were, with an earthy substance in *adynamic* diseases, particularly in the last stage of grave and epidemic dysenteries, and often also in phthisis pulmonalis. It becomes of a *livid* hue in persons of full habit when chilled, in scurvy, diseases of the heart, and certain chronic inflammations of the intestinal canal. In most of these affections the lividity is more apparent in some parts than others, as about the lips, eyes and fingers. The skin is of a *rosy* hue in inflammatory fevers, and just previous to the development of general eruptions, it is of a bright *red* color in scarlatina. It presents a *yellowish* tint in certain bilious affections; is of a dull yellow color in intermittent fevers when of a certain duration, of a pale yellow or *earthy* appearance in cancer, and of a *citron* or *deep yellow* color in jaundice; it becomes of a *bluish* tint in those suffering under the severest form of Asiatic cholera. The same is observed in certain organic affections of the heart; this singular discoloration is called *cyanosis*.* This has generally been attributed to malformation of the heart, which allows the blood, at least a portion of it, to pass from the right to the left side of the heart, without first traversing the lungs. But cyanosis is often independent of every such lesion, and even in the cases in which there is permanent patency of the foramen Botale, it is evident that this affection cannot be referred to admixture of the two fluids, as this phenomenon sometimes fails in cases where the heart being unilocular, the pulmonary artery and aorta have a common origin. Cyanosis seems to depend on a stagnation of blood in the capillary vessels, produced by some obstacle to its circulation through the lungs and heart; it is observed in different

* *Κυανος*, blue.

degrees, in most organic diseases of this viscus, and particularly in contraction of its orifices, in certain forms of pulmonary emphysema, and general or capillary bronchitis, and lastly, in some cases of rachitis, in which there is considerable deformity of the thorax. In these different diseases, cyanosis is generally partial, affecting usually the face, particularly the cheeks and lips, the hands, principally about the nails and the pulp of the fingers, and (in the male) the genital organs, becoming more marked in all these parts when general.* We have observed a *greenish* tint in the skin of an anemic patient who appeared to labor under an affection of the liver. The skin, in some individuals, accidentally becomes, from the influence of some unknown cause, of a *blackish* or brownish color. This was the case with a patient who spent several months at the Hospital de la Charité, whose skin, naturally white, became almost as black as that of a negro.† Several similar cases have been observed and published by M. Rostan.‡

In connection with these cases may be mentioned those, in which the blackish or bluish color is owing to a coloring matter which transudes through the skin, a very curious example of which is given by Billard. ||

Lastly, it is well known that the internal use of nitrate of silver, when long continued, produces in the skin a bronze or slate color which is indelible. It has been supposed that the light exerted a great influence in its production; but to us this does not appear a satisfactory explanation. We believe that light has the property of increasing the color, but is not the sole agent in its production; for this brown tint appears in parts of the body which are shielded from it by clothing, as well as in those parts which are exposed to its influence; it is also found to exist in internal organs.

The skin presents, in some cases, red, black, bluish or yellow spots called ecchymoses, which are caused by extravasation of blood; they are often produced by contusions, pressure and other external causes; and are sometimes owing to a cachectic state of the system, as in scurvy and *morbus maculosus*.

Spots of a livid, brown or blackish tint, are sometimes observed in the course of acute diseases, generally appearing upon the most depending parts, and constituting an unfavorable sign. These spots have been sometimes confounded with ecchymoses, but are generally rather the result of stagnation than extravasation of blood, as they momentarily disappear under pressure. Eschars and excoriations are also formed upon various parts of the surface of the body, and particularly those upon which the body rests, as the region of the sacrum and trochanters. This phenomenon is of more frequent occurrence in typhoid than in other acute affections, and its appearance in obscure cases is an important diagnostic sign.

* *Dictionnaire de Médecine* t. ix. Cyanose, par FERRUS; et LOUIS *Memoires anat-pathol.*, ou *Archives* de 1823.

† *Bulletin de la Faculté*, t. iv., p. 114.

‡ *Idem*.

|| *Archives de Médecine* t. xxvi., p. 453.

The skin may undergo modifications of more or less importance in disease, which are appreciable to the touch. Instead of remaining pliant and soft as in health, it often becomes dry and rough, as in the first stages of acute affections, and in chronic diseases. This roughness and dryness becomes still more marked during convalescence from certain eruptive diseases, as rubeola and variola. After scarlatina it is dry, smooth and shining, as if covered with goldbeater's skin; this state of the skin which is more apparent in the hands, enables the physician, even before desquamation has commenced, to decide upon the previous existence of scarlatina. In Asiatic cholera, the skin in various parts of the body, particularly upon the back of the hands and forearms, strikingly resembles parchment. When pinched between the fingers it forms a fold which retains its form for some minutes; in this affection also, the palmar surfaces of the fingers present inequalities, similar to those which are produced in the same parts, after their prolonged immersion in water.

F. The skin is the seat of various *eruptions*. These have been distinguished by the terms *exanthemata*, *vesicula*, *bullæ*, *pustulæ*, *papulæ*, *squamæ*, *tubercula* and *maculæ*. *Exanthemata* are reddish spots, with or without prominence, which vary in size, form, and degree of color, and which disappear on pressure of the finger. *Vesicula* are small elevations of the epidermis, formed by a collection of serous and transparent fluid which sometimes becomes opaque. *Bullæ* differ from the latter only in their size, which is not less than that of a pea, while vesicles do not exceed that of a millet seed. *Pustulæ* are small tumors filled with pus, developed upon the surface of the inflamed corpus mucosum. *Papulæ* are small hard elevations which contain no fluid, but are susceptible of ulceration. *Squamæ* are small laminæ of epidermis generally thickened, dry, whitish and friable, which surmount small elevations resembling papules. The name *tubercula* has, in cutaneous pathology, been applied to small, hard, circumscribed and permanent tumors, susceptible of ulceration or partial suppuration. *Maculæ* are colorations or permanent discolorations of certain portions of the skin, or of the whole cutaneous envelope, unattended with general constitutional disturbance.*

G. *Plicatures* are impressions made upon the skin by the contact of bedclothes, or clothing. When occurring in health, they are superficial, of a rosy color, and readily disappear. In certain diseases, they are deep, lasting, of a livid or bluish tint, and sometimes excoriated. *Vibices* (*vibices*) are a species of plicature, although in some cases they are but varieties of urticaria.

H. To these symptoms furnished by the exterior of the body,

* *Abregé pratique des Maladies de la Peau*, d'après les leçons du docteur Bielt par Alph. Cazenave et Schedel. 3d edit.

may be added tumors, excoriations, fissures, wounds, ulcers and fistulæ, which may appear on any part of the body. *Tumors* (tumores) consist of a partial increase in the natural size of any part; they vary in form, mode of increase, consistence and in their constituent parts. Some disappear under certain circumstances, and particularly under the influence of pressure; others convey to the fingers a feeling of *fluctuation* owing to the presence of a fluid which they contain; others, as certain hæmorrhoidal tumors, are endowed with a kind of erectility. An *excoriation* is the appearance presented by the skin when deprived of its epidermis, and the most superficial layers of the corion; it occurs in grave diseases, and commonly precedes the formation of eschars.

Fissures (fissura) is the name given to those solutions of continuity which occur in different parts of the body, and which seem by their elongated and narrow form, to result from excessive distension of the skin: they are generally owing to syphilitic virus or certain eruptions; they appear on the back of the hand, but more frequently at the points of junction of the skin and mucous membranes, as about the nose, lips, nipples and orifice of the rectum. *Ulcers* (ulcera) are solutions of continuity depending upon some constitutional or local disease. Of these, there are numerous varieties according to the elevation of their edges, color of the ulcerated surface, and phenomena which generally accompany them. *Fistulæ* are accidental canals which convey away, sometimes matters contained in natural canals, and sometimes the product of a morbid exhalation.

§ II. The *head*, considered as a whole and with reference to position and size, furnishes some remarkable symptoms.

It is inclined laterally in convulsions, paralysis of the muscles of one side, torticollis, dislocation of the vertebræ and certain engorgements of the cervical glands; it is strongly bent backward in croup and in some diseases accompanied by dyspnœa; it is inclined forward in cases of vertebral malformation.

The portion of the head corresponding to the *cranium* is the seat of many important symptoms. Its volume is increased in congenital hydrocephalus. The hairy scalp, when affected with erysipelas, becomes *œdematous*, with extreme *sensibility* to pressure. These two phenomena are particularly important, as the redness, which is the principal sign of the disease in other parts of the body, is rarely observed in this variety.

In idiots, the forehead is generally low, narrow and receding; or the occiput may be flattened and directed vertically towards the summit of the head. In some cases the two sides of the cranium are not symmetrical, one, generally in the parietal region, being more or less depressed. The cranium may present tumors which are developed either in one of its bones, in the surrounding integuments, or in the substance contained within it. Its integuments are the peculiar seat of certain eruptions, as crusta lactea and tinea.

The symptoms furnished by the face are extremely numerous, of which the most important and difficult of exposition are those

presented by the *physiognomy*. This in health is characterized, as has been remarked by *Chaussier*, by vigor and alacrity, and its expression is in harmony with surrounding objects. The various shades of expression which the physiognomy is capable of presenting under morbid influence, it would be impossible to describe; it may appear sad, dejected, uneasy, terrified, indifferent or attentive, sometimes smiling, at others menacing or wandering, without there being any circumstance to account for these modifications of the features, which consequently should be classed among the morbid phenomena.

The natural symmetry of the two sides of the face is destroyed in cases of complete hemiplegia, and in paraiysis of the nerves of the seventh pair. The paralyzed side loses all expression, while the natural appearance of the sound side is retained; there is manifest deviation of the mouth, its commissures being drawn down and towards the median line; the cheek is flaccid, and the eyelids are no longer capable of covering the eye; the eyebrow is depressed, and the forehead free from its natural wrinkles. All these differences become still more marked, when the muscles of the sound side are strongly contracted, particularly in the effort of laughing. If the disease be of long standing, the nose becomes affected.

Among the numerous alterations of the countenance effected by disease, some have received distinctive appellations; as stupor (*facies stupida*), the injected, pinched, and hippocratic countenance. It has also been observed that diseases of the brain, chest, and abdomen so modify the countenance as to enable the physician, in many instances, to determine from its inspection the seat of the disease.

Stupor is distinguished by a want of expression of the features generally, and particularly the eyes; the patient appears unconscious of what is going on around him, and incapable of reflection, as if in a state of intoxication. This expression of face is peculiar to typhoid disease.

The *facies vultuosa* is characterized by fulness and redness of the part, prominence of the eyes, injection of the conjunctivæ, distension of the eyelids and lips, and fulness of all the features. This is particularly observed in hypertrophy of the heart, and in some cases of cerebral congestion.

The *pinched* countenance, which belongs to acute peritonitis, presents the opposite characteristics; the face appears diminished in size, of a pale or livid hue, its muscles contracted, and the features drawn upward or towards the median line. Exposure to severe cold produces analogous effects in healthy persons.

The *hippocratic* countenance has been so called from Hippocrates, who first pointed out its peculiar characteristics. It is observable in patients suffering from chronic disease, a few days before death, and in some cases of prolonged acute disease. Its principal features are the pinched nose, sunken eyes, hollow temples, cold and retracted ears, dryness and tensity of the skin of the forehead, livid complexion, and cold and relaxed lips; such are

the sure harbingers of death, unless there be some manifest cause, as excessive watchfulness, obstinate diarrhœa, or prolonged abstinence, to account for such an appearance.

Diseases of the head are far from impressing upon the physiognomy uniform characteristics; the same is true of thoracic and abdominal diseases. There are, however, numerous affections of the organs contained within these cavities, in which the appearance of the countenance is characteristic. The appearance of sleep, convulsions of the facial muscles, lateral paralysis, an expression of fury or joy, are indicative of a primary, or secondary lesion of the brain; fulness of the face or neck, together with a whistling sound in the larynx, or convulsive efforts at deglutition or expectoration, clearly denote some form of angina. There is a peculiar alteration in the face noticeable in diseases of the heart, and in phthisis pulmonalis, though in the latter it is less apparent. The pinched face, as has been remarked, is peculiar to peritonitis, and most abdominal diseases of an organic nature are discoverable by their effect upon the countenance of the patient.

M. Jadelot thought he observed in children, a constant correspondence, between diseases of the head, chest, and abdomen, and certain alterations in the physiognomy, differing from those just mentioned. The following, appeared in a work published under the supervision of this physician.* In the face of the child three principal features are observable; the first, extending from the external angle of the orbit of the eye, to a little below the prominence formed by the malar bone; this may be called the *oculo-zygomatic*; the second commences at the superior part of the ala nasi, and embraces in a semicircle, more or less complete, the external line of the commissure of the lips; this is the *nasal* feature to which another sometimes extends, from the middle of the cheek called *genal*; the last commences at the angle of the lips, and terminates at the lower part of the face, which may be called the *labial* feature. The first indicates affections of the brain and nervous system; the second and its accessory point out those of the abdominal viscera; the third appertains to diseases of the heart and respiratory organs.†

The face furnishes still other symptoms relative to changes in its motions, size, color, and the eruptions of which it is the seat.

Convulsive *movements* of the face are observed in incipient tetanus, permanent immobility in some nervous diseases, and transient tremors in typhus fever; in some cases of cerebral compression, the paralysis is confined to the muscles of this region.

The face rarely becomes increased or diminished in *volume*, without the occurrence of a similar change in other parts of the

* *Maladies des Enfants d'Underwood*, publiées par M. de Salles, avec des notes de M. Jadelot.

† We refrain from all conclusions upon the value of these signs; first, because our observations upon this point have been thus far too limited to enable us to form an opinion; and second, because the result of these observations would not conform to the opinion of M. Jadelot.

body; partial turgescence of this region, however, is common at the commencement of eruptive fevers, and sometimes just previous to nasal or cerebral hæmorrhage. It may be also remarked that in those cases in which increase or diminution in volume of the whole body occurs, these changes are perceptible in the face before becoming so in other parts.

In disease, the same changes occur in the *color* of the face as in that of other parts; it also undergoes modifications which do not extend to the rest of the cutaneous surface. *Redness* of the face is a very frequent symptom; it may affect its whole surface or be confined to a particular part. The face is of a bright red color in the paroxysms of acute diseases, of a deep and livid red in those of hysteria and epilepsy, and the difficulty of distinguishing between the two latter affections is partly owing to this circumstance; in hysteria, however, the face does not present the same hideous aspect as in epilepsy, and this, according to M. *Landré Beauvais*, is perhaps the most important sign in the diagnoses of these two affections. The face is occasionally the seat of a transient redness, commonly known as *feux au visage*; this is particularly observable in females suffering from menstrual irregularity, or at the critical age. The seat of the redness during the febrile paroxysm and in chronic diseases, is the malar region. It is sometimes confined to one cheek, a phenomenon formerly considered as connected with an acute or chronic affection of the corresponding lung; but it generally depends upon the position of the patient when in bed, the cheek which rests upon the pillow being redder than that of the opposite side. A bright and circumscribed redness in the malar regions, together with *paleness* of the rest of the face, is a frequent symptom in tubercular affections. The *yellowness* which characterizes jaundice is generally perceptible in the face, and particularly in the sclerotics, before appearing elsewhere; it also remains apparent in these, after its entire disappearance in other parts of the body. In some bilious affections, the yellow tint is confined to the labial commissures and *alæ nasi*.

There are certain *eruptions* which are peculiar to the face; during the period of youth the forehead often becomes the seat of a papular eruption which commonly disappears before the age of twenty-five. In adults, towards the decline of ephemeral fevers and slight acute inflammatory affections, the lips become affected with an herpetic eruption. Every part of the face furnishes numerous symptoms, which we shall briefly enumerate.

In health, the *eyes* are moderately prominent, moist, brilliant, moving with facility, and both directed to the same object; the white portion of the eye is smooth, unstriated, and of its natural color; the pupils of both, dilate and contract promptly and equally; the eyelids are thin, moveable, equally separated during the waking state, and entirely cover the eye during sleep; the eyebrows are slightly arched. Under the influence of disease, the globe of the eye and the parts which protect it, present remarkable changes.

The expression of the eyes often corresponds with that of the rest of the face: it may be mild, suppliant, threatening, haggard, or terrified; but sometimes in the disturbance which accompanies malignant fevers and the cerebral phlegmasiæ, their expression is in contrast with that of the physiognomy.

The changes observed in the movements of the eye are generally connected with some primary or secondary lesion of the brain. The eyes are *fixed* in catalepsy, and in the ecstasy of melancholics; their motions are convulsive in the hydrocephalus of children: strabismus or divergence of the optic axes, when occurring accidentally, is almost always the effect of cerebral disease.

There is another very remarkable phenomenon, resembling ordinary strabismus, but differing from it in some respects; we refer to the isolated movement of one eye, the other remaining totally immovable; we witnessed the repeated occurrence of this phenomenon in a case of hemiplegia in a child from ten to twelve years of age, succeeding epileptiform convulsions which were probably connected with some organic lesion of the brain. This symptom, together with a state nearly comatose, had excited fears which were not however realized.

The *volume* of the eye appears increased in some inflammatory fevers, and particularly in cases where an obstacle exists to the flow of venous blood in the vessels of the neck, as in severe anginose affections and apoplexy by strangulation; the prominence of the eye is lessened, on the contrary, when there is diminution of the cellular substance at the bottom of the orbits. The unequal separation of the eyelids may cause an apparent difference in the prominence of the two eyes; but in all these cases their real size remains about the same. The size of this organ becomes actually increased in internal ophthalmia and hydrophthalmia; it is diminished in the atrophy which follows various diseases of this organ, in wounds and after certain operations. It becomes very prominent, without increase of size, when a tumor is developed at the bottom of the orbit, or within the cranium, which presses it out (*exophthalmia*). Inflammation of the cellular tissue of the orbit produces a similar effect. The color of the eye corresponds with that of the rest of the face; but these alterations in color are almost always confined to the sclerotic and its covering membrane, the conjunctiva. Dulness of the cornea is not unfrequently observed in acute and chronic diseases a few hours before death.

The *cornea* sometimes presents spots of different forms, phlyctænæ, ulcerations, purulent collections, &c., in the diseases which are peculiar to it. It may become prominent, the effect of which is to increase the refraction of the luminous rays, producing what is called myopia; in other cases it becomes flattened, causing a diminution in the refracting power of the eye, and constituting presbyopia.

The motions of the *pupil* may become variously deranged. This aperture is sometimes considerably dilated, although exposed to a strong light; or it may contract slightly and slowly, as in coma-

tose affections. In other cases, it is contracted, as in internal ophthalmia and meningitis; it is almost always immovable in amaurosis, and sometimes becomes of unequal size in the two eyes, either from a difference in their natural contractility, or from compression of one side of the brain; its form becomes irregular in diseases of the iris. According to M. Jadelot, this irregularity also occurs in some verminous diseases.

The *crystalline* with its capsule become opaque in cataract; the aqueous and vitreous humors become changed in color in hypopyon and glaucoma.

Professor Sanson has recently pointed out a phenomenon, which will aid in the diagnosis of many diseases of the eye. If a light be placed before this organ, no part of which has been rendered opaque by disease, and the pupil of which is dilated either by the action of belladonna or in consequence of amaurosis, three images of the flame will be distinctly and constantly visible, situated one behind the other; of these, two are *upright* and the other *reversed*. The most anterior, which is also the most apparent, is upright; that situated posteriorly, is the palest and is also upright; the third, which is situated between the other two, is reversed. The latter is the smallest of the three, being less apparent than the anterior, but brighter than the posterior, image. These three images fail to appear if the cornea be opaque. If the opacity affect the anterior surface of the capsule only, the two posterior images are not visible; if confined to its posterior surface, the reversed image will alone be wanting. The existence of the three images is a certain sign that the crystalline and its capsule are perfectly transparent. This new method of exploration in diseases of the eye, enables us to distinguish with certainty, in some obscure cases, between amaurosis and black cataract, glaucoma and the ordinary form of cataract.*

The parts comprised by Haller in the term, *tutamina oculi*, present in disease numerous alterations.

Rapid and repeated motions of the *eyelids*, or perpetual nictation (*hippus*) is observed in some cases of mania and idiocy; in other cases, as in adynamic fevers, their motions are extremely slow, and occur at long intervals. In cephalalgia they have a feeling of weight, as some patients have expressed it; they are constantly closed in comatose affections, and in certain cases of ophthalmia their closure is accompanied with a violent contraction of the muscles; they remain partially open during sleep, in some persons; in others, during the waking state, they are unequally separated on the two sides, as is sometimes observed in hemicrania, hemiplegia, and certain acute cerebral diseases. In partial paralysis, produced by a lesion of the nerve of the seventh pair, closure

* *L'Experience*, No. 1, 1837, t. 1, p. 1, M. M. Bardinot et Pigné, pupils of Sanson, have shown by a series of careful experiments performed in the presence of the professor, that the anterior image is produced by the cornea, the middle one is reflected by the posterior segment of the capsule, and the posterior one by its anterior segment.

of the eyelids is impossible, in consequence of a partial loss of contractility of the orbicularis muscle. The *volume* of the eyelids with that of the neighboring parts, becomes increased in erysipelas of the face and in œdema; the swelling of this part is generally more considerable on account of the laxity of the cellular tissue, of which its structure is composed; they sometimes become suddenly emphysematous, from contusion at the root of the nose, or after violent efforts to blow the nose. In both cases it is owing to a rupture of the osseous parts which form the roof of the nose. The *color* of the eyelids generally corresponds to that of the face. Their free edges become red and swollen in chronic ophthalmia; they become inverted and everted in some diseases of which they are the seat. Their adherent borders, particularly of the lower lid, are often marked by a bluish line: the eyes are then said to be *cernés*. This phenomenon occurs in many females during menstruation. It may however be produced in both sexes by watchfulness, fatigue, excessive coitus, and excessive evacuations of any kind.

The *conjunctiva* becomes more moist and of a deeper red in eruptive fevers, typhus, and particularly in ophthalmia. It is more or less swollen in inflammation, and often forms a sort of border around the cornea (chemosis). Its natural humidity becomes sometimes diminished: the eyes are then said to be dry. In some cases the mucus which it exhales, forms whitish striæ on the globe of the eye; in grave diseases the patient becomes unconscious, and neglects to clear it away.

The *caruncula lachrymalis* furnishes few important symptoms; it is of a bright red color in inflammatory diseases, and becomes pale in chronic affections. Paleness of this little organ is by some authors considered as a never failing symptom in dropsy; but this is incorrect. Hairs are sometimes developed on its surface, which by contact irritate the eye, and produce obstinate ophthalmia.

The *eyelashes* become sometimes covered with dust, and more often with scales, in affections of the eye and in severe acute diseases. Their *inversion* produces obstinate ophthalmia, and their *fall* is often the result of ulceration of the free edges of the eyelids. Their length when considerable has, by some physicians, been thought to belong to the tubercular constitution.

The *lachrymal sac* becomes swollen, red and ulcerated, when any obstacle exists to the passage of the tears into the nasal canal. A flowing of the tears over the cheek is often produced by the same cause. This latter symptom, called *epiphora*, may also be owing to closure of the puncta and lachrymal canals, and also to paralysis of the lids or eversion of the lower lid.

The *eyebrows* are raised in the furious delirium of fevers and paroxysms of mania, and depressed in cases of melancholy and violent cephalalgia. They are alternately elevated and depressed during inspiration and expiration, in certain diseases accompanied with great difficulty of breathing. These alternate movements are sometimes confined to one brow, the other remaining immovable. In paralysis of the facial nerve, the eyebrow of the same

side is depressed, and can no longer be drawn towards that of the opposite side.

The *forehead* in health is ordinarily smooth and serene. It becomes wrinkled in painful and convulsive, and is the seat of a papular eruption and exostosis in syphilitic affections.

The *temples* in their natural state are full and smooth; they become concave towards the termination of acute and chronic diseases. The pulsations of the superficial arteries of this region are more manifest in diseases attended with an increased flow of blood to the head.

The *cheeks*, firm and round in health, and exhibiting more color in the malar regions, may become in disease agitated with convulsive motions, or paralyzed; in the latter case, they are flabby and become distended with food in mastication, and with air if the patient attempt to blow out a light. One or both cheeks may be increased in bulk in odontalgia and certain affections of the maxillary sinus. They sometimes become the seat of red and obstinate pustules known by the name of *gutta rosea*, which some physicians have supposed to be connected with a peculiar affection of the liver.

The *nose*, which contributes but little to the expression of the face, furnishes few symptoms. It has been sometimes observed to deviate to the right or left before a convulsive attack, and to become red before epistaxis. It is swollen and shining at the commencement of erysipelas which has not yet extended to the rest of the face. It becomes thin towards the close of acute and chronic diseases. Its extremity becomes livid and gangrenous in certain adynamic fevers, or in consequence of severe cold.

The *nares* also deserve attention; their dilation is rapid and convulsive at the moment of respiration in affections accompanied with considerable difficulty of breathing; but in cases of extreme debility and emaciation they are contracted, as is observed in the hippocratic countenance. In paralysis of the facial nerve the naris of the affected side is immovable; and not only is it incapable of dilatation during the act of inspiration, but is often depressed. The nares are sometimes filled with a blackish mucus in the course of grave fevers; they become the seat of a scaly eruption towards the close of some light diseases, and of fissures in scrofulous children. Tumors developed in the nasal fossæ may be seen in the interior of the nares, and in some cases they protrude beyond these openings.

The *lips* in healthy persons are free and supple in their motions; when at rest, they are closed, firm and sustained by the action of their muscles; their borders are smooth, rounded, and of a rose color. In disease, they present important alterations in respect to their position, motions, volume, color, state of dryness or humidity, and the eruptions of which they are the seat.

They are pendent in adynamic fevers, and in the agony of various diseases; they are widely separated from each other in forward dislocation of the lower jaw; compressed and contracted in violent

pain; trembling, in some nervous affections: they are suddenly thrust forward and separated at each expiration in certain cerebral affections; this is said to resemble a person in the act of smoking a pipe. The lips are drawn to the right or left, when one side of the face is affected with paralysis, or convulsion; in the latter case the symptom is called a *cynic spasm* (*spasmus cynicus*);* when the two commissures are drawn away from each other, it is called the *risus sardonicus*.† It has been said that the upper lip is thick in scrofulous persons, but to this there are numerous exceptions. Swelling of both lips precedes and accompanies the eruptions which sometimes appear at the decline of certain acute affections.

Their color is of a vermilion red in inflammatory diseases, pale in anemia and chlorosis, livid in the cold stage of intermittent fevers and in organic lesions of the heart.

The lips are dry, ordinarily smooth, sometimes cracked, in grave fevers; they may also become covered with a dry and blackish coat, similar to that which appears upon the teeth and tongue. This dryness and these deposits of buccal mucus are sometimes observed in the lightest affections, and even in healthy persons who sleep with the mouth open. The necessity of sleeping with the mouth open is connected with an anatomical disposition which we do not recollect to have seen pointed out. It consists in a malformation of the roof of the mouth, which being too much arched towards the nasal fossæ and too narrow between the dental arches, produces, as the inevitable result, narrowness and shortness of the nasal fossæ, or rather a drawing up of the upper lip. All those persons, in whom the upper lip does not cover the teeth, not extending below the alveoli, sleep necessarily with the mouth open.

The *chin* participates in the changes which the face undergoes; there are few which are peculiar to it. It deviates from the median line of the body in dislocation of one side of the jaw, and is often deformed in fracture of this bone. It sometimes becomes the seat of an herpetic eruption, known by the name *mentagra*. It presents in the agony, at the moment of the last inspiration, a convulsive falling which immediately precedes death.

The *parotid regions* become, in some affections, the seat of a remarkable swelling, affecting the glands themselves or the cellular substance in which they are enveloped. This swelling, which occurs in typhus and many other acute diseases, either at their commencement or termination, demands the careful attention of the physician. To this symptom the term *parotis* has been applied. It may be confined to both sides, or extend to both at once, or successively; it may be hardly perceptible or very considerable, &c.

* *Κυν, κυνος*, a dog.

† It has been said that this name was given to the convulsive laugh, from its having been sometimes produced by the use of a plant [*ranunculus*] which grows in Sardinia, *ab herba Sardonia*.

The *ears* are livid and cold during the first stage of intermittent fevers; red and burning in the paroxysm of nearly all febrile affections, and particularly those accompanied with a determination of blood to the head. The meatus externus may become the seat of various discharges, as mucus, pus, blood, and in some cases fragments of bone. In some affections, the air which penetrates into the cavity of the tympanum through the eustachian tube, may issue from the meatus with sufficient force to agitate a light placed before it, or to produce a gurgling sound as it mixes with the pus which may be contained in the part. This canal may be contracted, or obliterated by vegetations or polypi, tumefaction of its lining membrane, the accumulation and desiccation of the matters it secretes, pressure exerted upon it by an abscess formed in its substance, or tumor developed near it. The mastoid process may become unusually prominent in consequence of disease of the bone; atrophy of this bone has been sometimes noticed, following caries.

The loss of the *hair*, which Hippocrates supposed to be a symptom of phthisis, rarely accompanies this disease. It is of frequent occurrence in syphilitic affections, affecting the beard and other portions of the pilous system; the hair is after a certain time partially restored. Where this is not the case, the phenomenon is designated by the term *alopecia*,* a rare symptom, the causes of which are unknown. The fall of hair is not unfrequently noticed during convalescence from typhus and eruptive fevers. The hair turns white in some instances, under the influence of a severe moral shock. It becomes of a greenish hue in those who work in copper, and red in those employed in the preparation of minium.

In *tinea*, the hair falls off, and is replaced by wooly tufts scattered over the scalp. In *plica polonica*, the inextricable interlacing of the hair is the principal symptom of this singular disease.

The *neck* becomes increased in bulk in some anginose affections, and in goitre; it is diminished in size, with other parts, in general emaciation, when it appears lengthened. The distension of the superficial veins of the neck and external jugulars, the undulatory reflux of the blood in these vessels, from the clavicle where it is very apparent, to the neighborhood of the jaw where it is no longer perceptible, has been pointed out as alone existing in aneurism of the right cavities of the heart; but more accurate observations have shown that it occurs as well in affections of the left as right side of the heart, and particularly in contraction of its orifices. Pulsations of the carotids are frequently observed in active aneurism of the left ventricle; this symptom also sometimes precedes delirium in acute diseases. Enlargement of the lymphatic glands is one of the most important symptoms presented by the cervical region. It accompanies or precedes acute and chronic eruptions of the face and scalp. Sudden swelling of the glands, accompanied by febrile symptoms, is an almost certain sign of ap-

* *Αλωπεγις*, a fox. This animal is said to be subject, in old age, to the loss of its hair.

proaching erysipelas of the face. That which comes on slowly is often owing to an affection of one of the neighboring teeth.

The *chest*, which in the healthy man is of a size proportionate to his stature and strength, is narrow and flat in pulmonary phthisis, and prominent in pulmonary emphysema. In rachitis, it presents various and numerous malformations to which we can here but allude, as they belong rather to the history of that disease, than to general pathology. The integuments covering the chest become very thin in chronic diseases; in the last stages of phthisis they form over the whole, or but a part of its extent, deep depressions between the ribs. In empyema, on the contrary, the intercostal spaces are often more prominent than the ribs themselves; this peculiar disposition is only perceptible where the integuments are very thin. There are certain cases in which one side of the chest is more voluminous than the other; this morbid disposition may depend on one of two opposite causes, either enlargement of one, or contraction of the other side; so that the disease is sometimes seated in the larger, and sometimes in the smaller side. Enlargement is owing to dilatation of the pulmonary vesicles, or an accumulation of fluid, and sometimes of air, in the cavity of the pleura. Contraction always follows effusion, and consequently enlargement of the same side of the chest: the lung which has been for a time compressed, regains its dimensions, if at all, very slowly, and its parietes in accommodating themselves to it, lose part of their fulness. A more circumscribed portion of the chest may present a fulness or partial depression: the former is sometimes observed, though often with difficulty, in pleuritic effusion confined to the base of one side of the chest, and more manifestly, in cases of arterial aneurism developed under the sternum or ribs, in pericarditis with effusion, in hypertrophy of the heart and in some cases of pulmonary emphysema. But to avoid error, it should be recollected that, according to the researches of M. Woillez,* the right side of the chest is normally larger than the left, the difference varying from one half a centimetre to three centimetres [about one inch]; that in left-handed persons there is often observed a prominence upon the left side anteriorly, which seems to depend upon increased thickness of the soft parts; that there are also persons whose chests are naturally prominent on one side, while they are depressed upon the other. The disposition is the reverse, in such cases, upon the opposite side. Partial contraction is particularly observable beneath the clavicles, in certain forms of tubercular phthisis, and more rarely at the base of the thorax, after the absorption of pleuritic effusions confined to that region.

The *mammæ* furnish certain symptoms which will be considered elsewhere.

The *shoulders* are raised and prominent in phthisical patients; one is lower than the other in lateral curvature of the trunk, pointed out by Laennec in those suffering or convalescent from

* *Recherches sur l'insp. et la mensur. de la poitrine.* 8vo. Paris, 1838.

considerable and prolonged pleuritic effusion. Prominence of one of the dorsal vertebræ is the most important symptom in Potts' disease. In *spina bifida*, a soft, fluctuating, and often translucent tumor in the vertebral region is distinguishable by the eye, and the absence of one or more spinous processes can be felt. A depression at the lower extremity of the sternum, in some workmen, is rather owing to habitual pressure on the part by the instruments they employ, than to disease. This is most frequently observed in shoemakers.

The exploration of the chest, by means of percussion and auscultation, reveals many other very important phenomena, which will be considered in the articles on the symptoms furnished by the respiration and circulation, and in the chapter on diagnosis.

The *abdomen*, in health, varies in size in different individuals, and is moderately resonant; it is firm without hardness, and pliant without softness.

The skin of the abdomen is generally smooth and of a white color. In women who have been once pregnant, and particularly those who have borne many children, whitish or bluish wrinkles are observed extending across the hypogastric region, to which the term *vergetures* has been applied, and which are certain indices of previous pregnancy; but it should be recollected that this sign fails in some women who have borne children, and sometimes occurs in persons of both sexes, in whom distension of the abdomen has previously taken place, either from a considerable accumulation of serum or fat. It is chiefly upon the surface of the abdomen that the rose-colored lenticular spots, peculiar to typhoid and typhus fevers, appear. The subcutaneous veins, in some cases of ascites, become considerably enlarged, forming a true varicose network, which will be hereafter considered (*venous circulation*). There often exists in pregnant women, on the median line, extending from the umbilicus to the pubis, a brownish coloration, owing to a superabundant secretion of pigmentum. The lower half of the *linea alba* sometimes presents below the umbilicus a very narrow opening, not easily distinguished, in which a small portion of the *epiploon* may become engaged. This affection has often given rise to obstinate vomiting and considerable emaciation, which has led to the belief in the existence of stomachal cancer, and which has been cured by the application of a bandage. It is therefore of the greatest importance in patients attacked with vomiting, to examine with particular care the whole extent of the *linea alba*, as well as all other parts of the abdominal surface where hernia is liable to occur. Lastly, after repeated parturition, the *linea alba* sometimes becomes thin and ruptured, allowing the intestines to form considerable tumors; and in subsequent pregnancies, the womb has been known to fall forward in front of the pubis, forming an enormous protuberance.

The *volume* of the abdomen may be increased or diminished under the influence of disease; its increase may be partial or general. In the latter case, it is almost always owing to the

presence of gas in the digestive canal, some fluid in the cavity of the peritoneum, or an abundant exhalation of fat within the cavity, and in the parietes of the abdomen. A moderate accumulation of air in the intestines increases the bulk and resonance of the abdomen: this is termed *meteorism* (*meteorismus*).^{*} If the accumulation be more abundant with distension of the abdomen, it is called *tympanites*;[†] these two words express nearly the same thing: the latter is, however, more generally employed in chronic diseases, and the former in acute affections, and particularly grave fevers.[‡]

The abdomen is frequently the seat of partial swellings. These occur in the hypochondriac regions in diseases of the liver and spleen, and in the epigastrium in hysteria. The bladder when distended with urine, forms an ovoid tumor in the hypogastrium, which sometimes extends to the umbilicus; the intestines, stomach, uterus, ovaries, and mesentric glands, may also form, in the different regions of the abdomen, tumors more or less distinct to the touch and sometimes to the eye: so with the cysts which are occasionally developed within this cavity, &c. These various tumors are, in some cases, very apparent, in others, they are alone evident from an obscure and deep seated resistance which they present.

Diminution in the volume of the abdomen may be general or partial.

Its volume is diminished in many chronic diseases, in consequence of the general emaciation. It becomes suddenly diminished also in some acute affections, as in violent colic, and particularly that produced by lead. In adynamic fevers and peritonitis, the abdomen often falls away a short time before death: a similar phenomenon is sometimes observed in patients who die dropsical. The abdomen becomes alternately diminished and increased in size in some affections, and particularly in hysteria and schirrus of the large intestines. The most important sign of the latter affection is prolonged constipation with progressive enlargement of the abdomen, alternating with abundant stools, which are followed by immediate sinking of the abdominal parietes. In hysteria, on the contrary, enlargement of the abdomen comes on rapidly, in consequence of gaseous exhalation, often disappearing as rapidly, without the appearance of any evacuation. Partial diminution of the abdomen is more rarely observed than circumscribed swelling: it is relative rather than absolute, and commonly succeeds the latter: such is that observed in the epigastrium, in some nervous affections, in the hypogastrium after the excretion of urine which has been for a long time retained in the hypochondriac regions, on a favorable termination of engorgement of the liver or spleen, &c. A partial diminution may, however, take place in some very rare cases; as depression of the

^{*} Μετεωρισμός, from μετεωρός, elevated.

[†] Τυμπανον, a drum.

[‡] FRANK, t. vii., p. 55.

epigastrium and left side from displacement of the spleen or stomach. Many examples of this are cited by *Morgagni*. M. Rayer has recently shown that displacement of a kidney may also give rise to these phenomena. In a case, in which the kidneys appeared placed transversely across the vertebral column, the lumbar region was depressed and flattened like the two sides of a saddle.* It is necessary, in order to distinguish this appearance, that the patient be placed on *all fours*.

The form of the abdomen is generally in relation to its volume; both increasing and diminishing simultaneously. The abdomen may, however, become very hard, although diminished in volume, as in metallic colic. An unusual resistance felt over the whole region is, in some cases, the only symptom of chronic peritonitis. The abdomen is soft in some cases of dropsy, when the quantity of fluid has been lessened by absorption or puncture.

The form of the abdomen varies according to the disease that produces its increase; in ascites, its dilatation takes place particularly from before backward, and the umbilicus, raised by the fluid that distends it, sometimes forms a small, pellucid tumor, which rests upon the enormous swelling presented by the abdomen. In œdematous swelling of the abdominal parietes, on the contrary, the transverse diameter is the greatest, and the flanks acquire an extraordinary width. In both cases the abdomen, to use the vulgar expression, falls to that side on which the patient lies; its form, in other respects, is regular. It is otherwise in the cases in which the increased size is owing to an encysted tumor, or to an organic affection of any viscus: in such cases, unless there be accompanying ascites, the abdomen presents a remarkable *irregularity* of form, particularly in the first stage of the disease.

The abdomen presents at various points, and particularly at the umbilicus, inguinal ring, crural arch, and on a level with the obturator foramina, tumors which appear and disappear, or at least become increased and diminished under certain circumstances, and which are formed of some one of the parts naturally contained within the cavity of the abdomen, protruding through one of the apertures alluded to. These tumors, which are called *herniæ*, may occur in the thorax and head; but they are as rare in those parts, as they are common in the abdomen. The inguinal regions are also the seat of many important phenomena, such as the buboes which occur in syphilis and the plague. The abscesses formed in the iliac regions and in front of the vertebral column, make their appearance in these regions.

The *organs of generation* furnish several important phenomena: the primary symptoms of syphilis almost always occur in these parts, and it is here that discharges, ulcers, vegetations frequently manifest themselves.

The *penis* is increased beyond its natural size in children af-

* RAYER. *Malad. des Reins*. Obs. xxxiii., t. 1, p. 407.

fectured with stone, in those addicted to masturbation, and in adults who have indulged immoderately in the pleasures of love. It is, in most diseases, in a state of permanent flaccidity; it disappears beneath the integuments in some affections of the scrotum and tunica vaginalis. In other diseases, as blennorrhagia and satyriasis, it is, on the contrary, continually in a state of erection. The *testicles* are retracted strongly against the inguinal ring in cases of nephritic calculus, ilio-scrotal neuralgia, and violent colic; this *retraction* is, in some cases, attended with very severe local pain. The *epididymis* and spermatic cord are the common seat of the inflammation which is said to be the consequence of repelled gonorrhœa, and which was for a long time supposed to be an affection of the testicle itself, which is but rarely and secondarily affected. The *tunica vaginalis*, distended with the fluid it exhales, is the ordinary seat of hydrocele which sometimes also affects the spermatic cord. The *scrotum* is considerably swollen in anasarca, voluminous inguinal herniæ, urinal abscesses, &c.

The *labia majora*, in the female, often become enormously swollen in dropsy; they are sometimes, as are the testicles in the male, the seat of violent inflammation, succeeding and alternating with parotiditis. The vulva is the seat of ulcerations and vegetations of a syphilitic origin, and not unfrequently of lypomatous and steatomatous tumors. The labia majora may also, together with the clitoris, become hypertrophied; the various malformations which characterize the female hermaphrodite and the tumors which take their rise in the uterus, here make their appearance. Lastly, there is sometimes observed, during pregnancy, a varicose development of veins, which is often but precursory to a much more serious disease, the trombus or sanguineous tumor, an affection which is peculiar to the period of labor.

The *limbs* also furnish to symptomatology numerous phenomena.

They are immovable and pliant in paralysis; their immobility is accompanied with stiffness, in softening of the brain, in various organic diseases of this viscus, in rheumatic affections, cramps and tonic convulsions; their movements are disordered in some nervous affections, as chorea and hysteria.

They become increased and diminished in size in those diseases which produce like effects in other parts of the body.

One of the limbs may become œdematous and engorged, when the vessels and nerves which are distributed to it, are compressed by a tumor. A tumor in the side may produce these results in the corresponding thigh; the arm is similarly affected in aneurism of the arch of the aorta. These phenomena principally depend upon some obstruction to the venous circulation, which may also produce a varicose development of the superficial veins.

The limbs often become swollen around the articulations, or in the parts between; the first takes place in articular rheumatism, hyarthrosis, white swelling, &c.; the second, which is much more rare, sometimes occurs in scurvy, in which the muscles become the seat of a sanguineous exhalation between their fibres; phlegmon,

abscesses and aneurisms may also produce partial swellings in these as in other parts of the body.

The limbs become diminished in size, in paralysis; in such cases the paralyzed limbs are those affected, in paraplegia both thighs, in hemiplegia the leg and arm of one side. In the paralysis, which occurs in children, increase in the length of the limb is sometimes checked, the part remaining for several years shorter by some inches than the other, and smaller in other respects. This atrophy is often observed to follow spontaneous dislocations.

The extremities of the limbs also present remarkable changes, in respect to size. Without noticing the diseases of which they are the special seat, as gout and caries, the *hands* are swollen in scarlatina and variola; it has also been remarked, that in plethora, the general intumescence is much more apparent in the hands than elsewhere; the fingers are sometimes so much swollen as to be with difficulty flexed. Beclard having observed that, in many children affected with cardiac aneurism, the last phalanx of the fingers was so much enlarged as to give the finger the form of a small club, was led to believe that a connection existed between this peculiarity and lesions of the heart, and considered it a sign of those diseases. This form of the fingers has been more recently thought to be peculiar to tubercular disease of the lungs. This phenomenon does not appear to us, in a semeiotic point of view, to deserve the importance that has been attached to it.

The *feet* become swollen in some affections, and particularly in incipient anasarca.

The alterations in color presented by the skin, are, in some affections, more marked at the extremities than in other parts of the limbs and trunk; as the lividity which occurs in the cold stage of febrile affections, the marbled appearance observed in some adynamic fevers, and the bluish tint which occurs in Asiatic cholera, in diseases of the heart, and in all cases where there is any obstruction to the pulmonary or cardiac circulation. We have seen the feet of a woman affected with elephantiasis, of a greyish slate color, with deep and regular furrows, and a hard and swollen condition of their tissue.

The *nails* deserve little attention, in relation to symptomatology; they are pale or livid in the cold stage of intermittent fevers, and present a yellowish tint in icterus. *Hippocrates* observed that they were curved in phthisical patients: this phenomenon, whatever be its cause, is here rarely well marked.

Such are the principal symptoms furnished by the exterior of the body; there are many others which we have not considered, as their place is more naturally among those furnished by each particular function.

SECTION SECOND.

Symptoms furnished by the Organs of Locomotion.

The organs of locomotion consist of the bones with their appendages, and of the muscles. The bones which serve as the base and support of all the other parts, affording them strength and stability, are the passive, while the muscles constitute the active, organs of locomotion.

1. The symptoms furnished by the bones are generally connected with diseases which are confined to these organs. They may however become the seat of syphilitic tumors, scurvy may effect separation of the cartilages and apophyses, before complete bony union has taken place, and tubercular disease may produce enlargement and caries.

The two principal symptoms of diseases of the osseous system, are *deformity* of the part and difficulty of motion. The former is present in nearly all fractures and dislocations; it is also apparent in osteo sarcoma, and particularly in rachitis or softening of the bones. In the latter affection, the limbs are not only incapable of supporting the body in the upright position and of every kind of regular motion, but they may be bent by the hand into any form. *Difficulty* or *complete loss* of motion, accompanies nearly all the affections of these organs; in some cases, voluntary motion is alone suspended, and the limb is capable of receiving the motion communicated to it, as in case of fracture; in other cases, every kind of spontaneous or communicated motion is impossible, as in ankylosis and some dislocations.

Another not less remarkable phenomenon is *crepitation* (*crepitatio*), a name given to the peculiar sound occasioned by the friction between the fragments of a bone, either broken, or separated from its apophyses or the cartilages to which it is naturally united.

A bone which has been laid bare by a wound or abscess, may present to the eye alterations in *color* and *structure*; it sometimes becomes of a dull white color, or presents a blackish tint; softening of its tissue may occur, giving rise to a more or less abundant sanies, and causing it to break down readily under the pressure of a blunt instrument (*caries*).

The slow *decay* of a bone, in a greater or less portion of its extent, gives rise to peculiar symptoms. This decay sometimes commences without any known cause, as in vertebral disease, in which it produces angular curvature of the spine. It is by the wearing away of the sternum and ribs, that an aneurismal tumor becomes apparent through the thoracic parietes. The walls of the cranium are sometimes *worn away* by fungous tumors, and by gently depressing them, the bony circle which surrounds them may be felt. In the latter case, before the destruction of the bony tissue is yet quite complete, the thin lamina which remains, if compressed, emits a sound like that of parchment.

II. The *muscles* present functional changes by far more numerous. Their action may be increased, diminished, destroyed or variously perverted.

Increase of muscular strength has only been observed in a few nervous affections, and particularly in mania, in which patients have been known to break the bonds which confine them, and successfully resist many persons.

In most diseases, the force of the contractions is *diminished*; the step is unsteady, the upright position painful or impossible, the motions feeble and uncertain, and often immediately followed and even preceded by a feeling of lassitude: many patients are obliged to remain quiet, and some are unable to leave their beds. Among the latter, there are also those who are unable to retain the sitting posture, to feed themselves, turn themselves in bed, and even to move their arms: in extreme cases, the hand of the patient, having been raised and abandoned to itself, falls like an inert body, obedient to the laws of gravity. This diminution of muscular power occurs, in different degrees, in incomplete paralysis; it may in this case be confined to certain parts, like the affection of which it is the symptom. There is a peculiar alteration in the muscular contractility, to which no special name has been given, but which we shall here notice. We refer to that so constantly observed in typhoid fever, and which, often occurring at the commencement of this affection, becomes one of the most important signs in its diagnosis. This alteration consists in a kind of *titubation* or trembling, and uncertainty in the gait and motions generally, which has been justly compared to that occasioned by intoxication.

The complete *abolition* of muscular contractility and voluntary motion, constitutes *paralysis* (*paralysis*);* a term applied to the loss of sensation as well as of motion, and to the simultaneous abolition of both these faculties. Hence, in medical language, to avoid ambiguity, the terms *paralysis of motion*, *paralysis of sensation*, should be employed. Paralysis is general in comatose affections, syncope, asphyxia, &c. It has been more generally designated by the term *resolution des membres* [*resolutio membrorum*]. If it affect but one side of the body, it is called *hemiplegia*;† if the lower half, *paraplegia*, or *paraplexia*;‡ if the arm of one side and the leg of the opposite, it is called *crossed paralysis*, which is very rare. It is sometimes confined to one or both wrists, as is occasionally observed in metallic colic, and more rarely in typhus. Paralysis often affects certain muscles which are devoted to a particular kind of motion, as is sometimes observed in lead colic, in which the extensors are principally affected, the hands and wrists being constantly and powerfully flexed. In some cases, it appears to affect but a single muscular fasciculus: this has been suspected in those cases, in which the tongue loses the

* Παράλυσις, from παραλύνω, I relax.

† Ημιπληγία, ημιπληξία, from ἡμισυς, half, and πλησσω, I strike.

‡ Παράπληξία, from πλησσω, I strike; παρα, dim. particle.

power of articulating certain letters, but appears to retain all its other motions. In permanent *ptosis*, or falling of the upper eyelid (*collapsus palpebræ*), the elevator muscle is alone paralyzed.

The muscular contractility may be variously *perverted*.

1. *Tremor* consists in a feeble and involuntary agitation, attributed by most physiologists to alternate contraction and relaxation of the muscles, or alternate contraction of opposite muscles. This symptom, which may be general or partial, occurs in the cold stage of intermittent fever and some nervous affections; it is often produced by the action of mercury and lead on the economy, and sometimes by the use of coffee and alcoholic liquors; it frequently occurs in old persons from the effects of age.

2. *Rigidity* (*rigiditas*) should be considered as a perversion of muscular contractility. The actual muscular power is, in this case, always diminished, although any attempt at communicated motion is met with more than ordinary resistance, as will be found to be the case, in attempting to draw the arm of the patient out of bed. This rigidity is evident to the patient himself; he moves his limbs slowly and with effort. Rigidity, like paralysis, may extend to all the muscles, or be confined to one side of the body, one half of the face, or to a certain few muscles; it is often connected with some disease of the brain, particularly softening of its substance.

3. *Cramp* (*crampus*) is a sudden but permanent contraction of one or more muscles, accompanied by hardness of their tissue, numbness and inability to execute any movement of the part thus affected. The muscles forming the calf of the leg are particularly liable to this affection. Many persons in health suffer from it; it is of frequent occurrence in women during the last months of pregnancy; it sometimes accompanies hysteria and painters' colic, and is of almost constant occurrence in the different species of cholera.

4. *Subsultus tendinum* is a twitching communicated to the tendons by the involuntary and instantaneous contraction of the muscular fibres. This symptom is more observable at the wrist than elsewhere, and may be felt by examining the pulse of the patient. It is common in acute diseases of an ataxic form.

5. *Carphologia** or *carpologia*, † consists in an automatic and continual agitation of the hands and fingers, which, in some cases, appear to seek flocculi in the air, and in others, to ramble about on the bedclothes. This symptom, which frequently accompanies very severe acute diseases, sometimes presents itself under a different form, the patient continually endeavoring to pick imaginary flocculi from the bedclothes: this is called *crocidismus*, ‡ which many authors have confounded with carphologia.

6. *Convulsions* (*convulsiones*) || consist in involuntary contractions of the muscles. They are divided into clonic and tonic.§

* Καρφη, flocculus; λεγω, I collect.

† Καρπος, wrist, a part of the hand; I collect with the hand.

‡ Κροκιδιζω. This word signifies to *pluck off the nap*.

From convellere, to shake.

§ Some authors have sought to establish a distinction between convulsion and

A. *Clonic convulsions* (*spasmi clonici*)* consist in violent and involuntary contractions, which alternate with relaxation of the contracted muscles, or with contractions of other muscles. The effects of these convulsions in hysterical females are various. Some throw their limbs to the right and left, unconsciously striking themselves, and rapidly flexing and extending their forearms and fingers. In others, particularly if the arms be confined, the body is alternately raised and depressed during the whole attack. We saw at the Hospital Saltpetrière, in one of the wards of M. Landré Beauvais, a young girl suffering from hysteria, who, in each attack, after the ordinary convulsive motions had passed off, suddenly and unconsciously rose, and holding the arms extended, rapidly turned herself about, until the supervision of another paroxysm. These were not of long duration. We recollect another case, that of a young girl at the Hotel Dieu, who, while the attack lasted, rolled about upon the floor of the ward. These clonic convulsions are not always general; they are sometimes partial in different nervous diseases, and even in hysteria and epilepsy. Dr. *Whytt* observed a very curious example of partial spasm in a young girl aged eight years. The masseter and temporal muscles were alternately contracted and relaxed and at irregular intervals, so as to imitate the pulsations of the heart, with this difference, that the muscular contractions were more than one hundred and forty, while the cardiac pulsations were not above ninety, in the minute. A violent fright put an end to this affection, the cause of which was unknown, and which resisted every method of treatment. In connection with clonic convulsions, may be mentioned the involuntary shaking of the limbs, to which *Gaubius* applied the term *palpitatio membrorum*.

B. In *tonic convulsions* (*spasmi tonici*),† the muscular contraction is permanent, so that the affected part is in a state of absolute immobility, which no internal or external effort can overcome. The equal and permanent contraction of all the muscles is called tetanic.‡ If the anterior muscles of the body be more strongly contracted, causing flexion of the head on the chest, and curvature of the body forward, the phenomenon is called *emprosthotonos*; || if, on the contrary, the body be bent backwards, so that the back of the head approximates to the spine, it is called *opisthotonos*.§ Lastly, to that variety, in which the muscles of one side are more powerfully contracted than those of the opposite, producing lateral

spasm. They have applied the term *convulsion* to those which we have called clonic, and the term *spasm*, to tonic convulsions. But as *Castelli* observes, the words *spasm* and *convulsion* have always been employed synonymously, and as we have elsewhere remarked, no change should be made in the acceptance of words sanctioned by custom.

* Σπασμος, from σπᾶω, I contract; κλονος, agitation.

† Τονος, tension.

‡ Τετανω, I stretch.

|| Ἐμπροσθεν, forward; τονος, tension.

§ Ὀπισθεν, backward; τονος, tension.

curvature of the body, the term *pleurosthotonos* is applied.* It sometimes happens that, in tonic convulsions, lateral and backward curvature of the body take place simultaneously, as we had occasion to remark in the case of a young man recorded in the *Journal de Médecine*.† Permanent or tonic convulsion is not always general, being sometimes confined to a particular part, to the elevator muscles of the jaw, for example, and to those which separate the lips. In these cases it is called *trismus*.‡ Cynic spasm and the *risus sardonius*, which have been already mentioned, are also tonic convulsions. ||

C. Can the muscular fibres which enter into the composition of the stomach, intestines, heart and urinary bladder, become the seat of convulsions, analogous to those observed in the voluntary muscles? Among the numerous facts which may serve to throw light upon this question, the emission of urine, of fecal matters and of spermatic fluid, in epileptic attacks the vomiting which occurs in hysteria, and the impossibility of swallowing, in some varieties of tetanus, are phenomena which would incline us to the belief that this derangement of contractility may affect all the muscles, whether voluntary or involuntary. If in these cases convulsive action be admitted, should it be referred to the tonic or clonic convulsions? This question, which appears to us of little importance, we think entirely insoluble.

7. There is another perversion, or *anomaly* § of muscular contractility, which is observed in *catalepsy* (*catalepsia*); ¶ in these cases, the patient retains, during the whole attack, the same position that he had assumed at the time of seizure, or remains in that in which he may be placed, however uncomfortable it may be. That this is not rigidity, is evident from the facility with which the limbs are moved; and the need of relaxation felt by the muscles in a state of contraction in health is no longer experienced in catalepsy. This symptom generally shows itself in females suffering from hysteria. We have known it to occur every other day in an insane woman. There is a variety of catalepsy which we once had occasion to observe, in which the patient retained the same posture that he had at the time of the attack, but did not preserve that communicated to him; the limbs yielded to an external force

* Πλευροσθέν, laterally; τόνος, tension.

† Tome xxix. 1814.

‡ Τρισμος, gnashing.

|| A curious symptom is mentioned by Dr. Kellie, in the twelfth volume of the *Edinburgh Medical and Surgical Journal*, as occurring in infants during dentition. It consists in a spastic contraction of the flexor muscles of the thumbs of the upper, and of the toes in the lower extremity, the former being rigidly contracted and permanently bent downwards, and laid flat upon the palms of the hand, and the latter bent down to the plantar aspect of the foot. This affection lasted from a few days to three months. — TRANS.

§ A privative, ὀμαλός, regular.

¶ Καταλαμβάνω, I seize.

which placed them in a new position, but resumed the first, as soon as the force was withdrawn.

8. A very remarkable perversion of muscular contractility is observed in the disease called *St. Vitus' Dance* (*Chorea Sancti Viti*). If the patient seek repose, he experiences sudden twitchings in the affected limbs; if he attempt to extend his hand to any object, it becomes affected by two kinds of motion, which tend to draw it in opposite directions; the one voluntary, by which the patient endeavors to accomplish his purpose; the other, involuntary and irresistible, which opposes his efforts; so that it is only by a series of oblique and divergent lines, that he succeeds in reaching the object. The lower limbs may also be similarly affected, producing an irregular and unsteady gait; whence the term *dance* or *chorea* which has been applied to this affection.

9. There is still another anomaly of muscular contractility, not less remarkable; it consists in being unable to execute any motion in a regular manner, unless with rapidity. Such is the case with those who are unable to walk, but who run without difficulty; so it is, as *Gaubius* remarked, in those who stutter when speaking slowly, but in whom this peculiarity disappears if they articulate rapidly.

10. We shall, finally, notice *contracture* [*contractura*,] which consists in permanent and chronic rigidity of the flexor muscles. These organs, whose length and thickness diminish, at the same time becoming harder, form under the skin inflexible cords, which prevent the extension of the limbs. This phenomenon is generally owing to a lesion in some part of the nervous system.

Such are the principal symptoms furnished by the active and passive organs of locomotion. They aid in completing what has been already said in regard to the exterior of the body.

SECTION THIRD.

Symptoms furnished by the Voice and Speech.

The voice, in health, is loud and sonorous; it aids, by its inflections, in expressing the various feelings, which man is capable of experiencing. The speech, or articulated voice, is ordinarily free and distinct.

1. The voice rarely becomes *stronger* under the influence of disease; this, however, is sometimes the case in delirium. In most affections, and particularly those of the vocal and respiratory organs, it becomes more *feeble*. It may be entirely lost, constituting *aphonia*.* This symptom should not be confounded with *mussitation* (*mussitatio*), in which the tongue and lips move as in the act of speaking, without producing any sound; these two affec-

* A privative, φωνη, voice.

tions are observed in some acute diseases ; they are also of *frequent* occurrence in the neuroses, and particularly in hysteria. Aphonia frequently occurs in the last stage of croup ; it may also depend on disease of the brain, spinal marrow or recurrent nerves. When it becomes chronic, it is generally owing to destruction of the vocal cords by ulceration, which is almost always of a syphilitic or tubercular nature, and in the latter case often co-existing with phthisis pulmonalis, as is shown by the researches of Louis. We should always be led to suspect the existence of this disease when aphonia has persisted for several months, and even when but of a few weeks' duration ; it is, in some circumstances, the first sign that reveals it.

The voice may become modified in *tone* as well as strength ; it is preternaturally *clear* in some malignant fevers, and before, or during delirium ; it is *shrill* in certain forms of angina, *whistling* in tetanus, *hoarse* in hydrophobia and in pulmonary or laryngeal phthisis, *nasal* in different affections of the pituitary membrane, and *discordant* in certain diseases of the larynx, as was observed by *Portal* in the case of a woman whose voice, while speaking, became alternately shrill and hoarse. In some varieties of melancholy, the voice, like the attitude of the patient, is in imitation of that of certain animals, as the dog and wolf ; these varieties of melancholy have consequently received the names *cynanthropia* * and *lycanthropia*. † Lastly, it has been observed that deafness effects a change in the voice, which, being no longer regulated by the ear, becomes altered in its tone and inflections.

II. The *speech* presents certain alterations, which may accompany those of the voice, or be manifested alone.

1. In certain grave fevers, the words are pronounced in a hesitating and trembling voice (*vox tremula*).

2. *Stammering* (*balbuties*) is a defect of speech which prevents the free articulation of certain letters or syllables which, after an effort to pronounce them, are quickly repeated ; this occurs in some diseases of the brain and in grave fevers. It is, as is well known, natural to some persons, and undoubtedly connected with some defect of organization.

3. *Articulation* is *slow* in many diseases ; prompt in others. In others there is great fluency of speech. The latter symptom was observed by *Senac* several times at the commencement of the paroxysms in intermittent fevers.

4. *Portal* had under his care a woman who commenced speaking with difficulty, but was unable to keep silent after uttering the first words : she was compelled to express by words all the thoughts that occurred to her, even when at church. This was the same patient in whom the discordance of sounds, which we have just mentioned, was noticed. There is a similar case, at present, in Paris.

* Κύων, κυνός, dog ; ἄνθρωπος, man.

† Λύκος, wolf ; ἄνθρωπος, man.

5. Loss of speech may exist independently of that of the voice, as is observed in *dumbness*, which consists in an inability to produce articulate sounds. The loss of the voice, on the contrary, is always accompanied by that of speech. The latter has been observed previous to apoplexy and in nervous diseases. It is sometimes the effect of poisoning. *Sauvages* relates that the robbers in the vicinity of Montpellier, caused their victims to drink wine in which had been infused the seeds of the thorn apple; this narcotic, according to that physician, produces a transient dumbness, which gave the robbers sufficient time to escape.

The peculiar method of exploration, to which Laennec has given the name *auscultation*,* applied to the voice, led that physician to the discovery of still other interesting phenomena, which, render the diagnosis of many frequent and grave diseases much more complete. These symptoms will be considered in connection with those which belong to respiration; we have thought it better to consider all the phenomena furnished by the auscultation of the respiratory passages in the same article.

SECTION FOURTH.

Derangements of Sensibility and of Sensation, considered as Symptoms.

The faculty of feeling is, in the natural state, imparted, variously modified, to many organs; it may, as is well known, become developed, under the influence of disease, in all the others, with the exception of the epidermis and its productions. It is by virtue of this faculty that different impressions are transmitted to the *sensorium commune*; some, called internal sensations, inform us of certain phenomena which are taking place within our bodies; others, to which the term *sensations* has been particularly applied, acquaint us with certain conditions or qualities of external objects about us. The faculty of feeling, considered generally, and the sensations, both internal and external, present under the influence of disease, numerous changes which we shall proceed to examine.

I. The derangements of sensibility which occur in disease, have been, by many physicians, considered as the effect of an unequal distribution of this faculty. Excessive pain in any part, they suppose to be the result of a morbid accumulation of sensibility, which in some subjects constantly takes place in some particular organ, and in others, successively in different parts. This theory does not appear to us to accord with facts. If there be some individuals in whom the sensibility, when augmented in any part, becomes diminished in all others, this is by no means

* From *auscultare*, to listen.

the case in the greatest number. It generally happens, as has been observed in hypochondria and hysteria, that the sensibility is diminished or increased in all the organs at once : it is equally augmented in all parts during the first period of certain acute cerebral affections ; it becomes everywhere simultaneously diminished, and even extinct, in the second and third periods of these affections.

Loss of sensibility is often connected with that of muscular contractility, particularly in cases where there is also loss of consciousness : the same cause, as compression of one of the cerebral hemispheres, may produce both these effects. There is then paralysis of motion and of sensation. In many cases of cerebral compression, in which there is a diminution or entire suspension of motion, the faculty of it is preserved, as also in some rare affections, whose material cause is unknown, the muscles preserve their contractility, while the integument that covers them is deprived of feeling. Some very ingenious researches have been recently undertaken, with a view to throw light upon this point in pathology : these led to the supposition that the exclusive office of the anterior and posterior fasciculi of which the medulla oblongata and spinalis are composed, is to transmit, the one motion and the other sensation, so that lesions confined to either one or the other, or to the parts from which they take their origin, produce derangement alone of one or the other of these functions, while those which affect both these nerves, or the whole spinal cord, would produce simultaneous derangement of motion and sensation. In support of this opinion, may be mentioned certain cases communicated to the Academy of Medicine, or published in the periodical collections ; but these facts, which have been contradicted by other experimenters, are yet too limited in number, and require further confirmation.

II. The *internal sensations*, in the healthy individual, chiefly consist in the wants connected with the regular exercise of the functions ; in disease, these wants, together with the functions on which they depend, become deranged ; other sensations also manifest themselves, which belong exclusively to disease, and which demand the attention of the physician ; such are the various kinds of pain.

As the nature of *pain* is familiar to all from experience, it will be useless to attempt its definition.

Pain may be produced by various causes with which we are but partially acquainted ; its effects may be less difficult to appreciate ; it varies in its nature, intensity, type, and seat.

The causes productive of pain in diseases are : 1, considerable alterations in the tissue of parts which are its seat, as wounds, inflammations, ulcerations, and organic affections ; 2, a too violent or long sustained action ; 3, an inexplicable modification in the motion of organs which become primarily or sympathetically painful, without any manifest cause.

The effects of pain are generally more apparent : 1, it de-

ranges the functions of the suffering organ ; in the muscle, it obstructs or hinders the motions, in the mouth, affecting mastication, in the thorax, respiration ; 2, it also determines, in some cases, an afflux of fluids, either to the surface or tissue of organs ; 3, it may produce sympathetic disturbance in distant parts, as vomiting in headache, and convulsions in many kinds of pain ; 4, it may cause, when occurring in its highest degree of intensity, disorder of nearly all the functions, and when prolonged may result in death.

Pain may exist variously modified ; each of its principal varieties has received particular names : 1, that which consists in a feeling of distension, has been called *tensive* ; it occurs especially in phlegmonous inflammation ; 2, a *heavy* pain is a feeling of weight which accompanies collections of fluid in natural or accidental cavities, and which is sometimes felt in many other affections ; 3, a *throbbing* pain is marked by its pulsations which are isochronous with those of the heart ; it is felt particularly in inflammatory tumors, in which suppuration is about to take place ; 4, *lancinating* pain is characterized by transient lancinations or shootings which do not correspond to the arterial pulsations ; this kind of pain is peculiar to cancer and neuralgia ; 5, a *bori*ng pain has been admitted, because those who experience it, compare it to the sensation which a wimble or screw would produce in entering and turning on itself in the suffering part ; it is felt in some cases of rheumatism ; 6, a *contusive* pain resembles that produced by a bruise : it frequently occurs among the precursory phenomena of acute diseases ; 7, the pain which is felt in anthrax and in gangrenous erysipelas, is compared by patients to that produced by the contact of ignited bodies ; this has been termed *burning* pain ; 8, the *prurigenous* pain, or itching, occurs in diseases of the skin ; 9, there is another kind of pain, which is called *formication* (*formicatio*), from its resemblance to the sensation which would be caused by a multitude of ants creeping over the part. Finally, pain may be *tearing* or *pungent*. Some patients compare their sensations to a wound whose edges have been removed, or the surface of which has been irritated by some mechanical agent ; others, to compression of the part by an iron band, or the fall of a heavy weight upon it, &c. Pain may become changed in character in the course of a disease : thus, in the first stage of phlegmon it is *tensive*, in the second, *throbbing*, and heavy, when suppuration has taken place.

Pain varies in its degree of intensity : this may be determined by the report of the patient, his expression of countenance, and the functional derangement it occasions. It may depend upon the cause which produced it, or the sensibility of the individual and particularly of the suffering organ. It is increased and diminished under different circumstances ; it is sometimes aggravated by heat, at others, by cold ; in the one case it is excited, in the other, moderated by external pressure ; prolonged movement in the former case, increases, in the latter, diminishes it. The expression of the

physiognomy, under the influence of pain, varies with the constitution and character of the patient.

The *type* of pain is sometimes continuous, with or without exacerbation, sometimes intermittent, with or without regularity. In the first case, the pain is uninterrupted, and of different or equal intensity; in the second, it ceases and reappears at regular or irregular intervals. Every pain which is reproduced without one of the types peculiar to intermittent fever, and the duration of which, at each return, is about the same as that of a paroxysm, deserves particular attention, as it is generally due to the same causes which produce intermittent fevers, and will yield to the same treatment.

There are certain pains, which are felt simultaneously in all parts of the body, as those which precede and accompany the invasion of some acute diseases; but they are generally *partial*, and even confined to a limited portion of the body. In some cases, they remain seated in the same place, in which case they are termed *fixed*; in others, they change their seat once or more; these being called vague or movable.* Fixed pains should always arouse the attention of the physician, for they are often indicative of important visceral changes. Thus, a circumscribed and continuous pain in the head, occurring in old persons, often proceeds from cerebral softening, in its incipient stages.

There are certain other painful sensations, which, though not exactly corresponding to pain, closely resembles it: such are the *general uneasiness* and *inquietude* which accompany different diseases; such also is *anxiety* which consists in extreme uneasiness, often more uncomfortable and insupportable than acute pain, and which, though generally felt throughout the whole body, is particularly referred to the epigastric region, obliging the patient continually to change his position. The highest degree of anxiety is *anguish*, which is ordinarily attended by palpitations, dyspnoea, and a change in the expression of the features and plaintive respiration; such are also those *internal movements* attributed by patients to the displacement of some viscus, to some foreign body, and often to a ball or *globe* (*globus hystericus*), which, rising from the hypogastric region or the left side, seems to ascend to the pharynx, producing a sense of suffocation.

* Pain has received different names, according to the portion of the body which is its seat. Cephalgia (κεφαλή, head, ἄλγος, pain) signifies pain in the head; herimicrania (ἱμικρανία, half, κρανιον, head) by corruption *migraine*, that confined to one of its sides, &c; to cephalgia is applied the epithet *frontal*, *supraorbital*, *synicpital* *occipital*, when it is exclusively confined to either of these regions. Pain in the ear is called *otalgia* (ὠς, ὠτός, ear); that of the teeth *odontalgia* (ὀδοὺς, ὀδόντοε, tooth). By the term *point de côté* (*stitch in the side*) is understood a pain occupying the lateral part of the chest. Pain situated in the epigastric region has received various appellations, as *cardialgia* (καρδία, orifice of the stomach), *cardiognus* (καρδιωγμος, pain of the cardia), *epigastralgia* (ἐπι, upon, γαστήρ, belly). Pain in the intestines is known by the name *colic* (κόλον, colon). Those of the kidneys, liver, and spine, have been termed by some authors, *nephralgia* (νεφρός, kidney), *hepatalgia* (ἥπαρ, liver), *rachialgia* (ραχίς, spine). Pain seated in the nerves is called *neuralgia* (νεῦρον, nerve), and that felt in the bones *osteocopus* (ὀστέον, bone, λῶπτω, I break.)

To this same series of symptoms, might be added the sensation of cold or heat, which some persons experience in the whole or a part of the body; but the consideration of the changes in animal heat, more naturally belongs elsewhere.

III. *External sensations.* In health, the organs of sense receive the impression of external objects, and transmit it, with promptness and precision, to the brain; under the influence of disease, these impressions may become wearisome, the perception confused, irregular or defective. Derangement of the sensations is sometimes produced by an affection of the organ which is its seat, and sometimes by the connection or association which may exist between that organ and the suffering part.

The sight, hearing, taste and touch, may suffer the same derangements as other functions, as exaltation, diminution, abolition, and the various perversions, among which authors have classed hallucinations, and illusions of the senses. But, as Esquirol* has justly remarked, in *hallucinations*, the mind is the sole seat of the affection; those, thus affected, indulge in day-dreams, their disordered brains giving a body and reality to images reproduced by the memory, or created by the imagination, without the intervention of the senses. In *illusions*, on the contrary, the patient is deceived in regard to the nature and cause of his real sensations. Illusions are not uncommon, even when the nervous system and organs of sense are free from disorder; but they are perceived by the reason, and by it the patient is enabled to guard against them. The case is different with the sick, and particularly the insane man, whose reason is often at fault, and whose sensations are consequently received as real, and as conveying no false impression.

A. Exaltation of *vision* occurs in ophthalmia, in inflammation of the retina, and of the meninges; dimness of vision takes place in typhus, &c.; its entire abolition, in blindness, amaurosis, cataract and certain nervous affections. The sight is sometimes singularly perverted: 1. It may exhibit objects which have no real existence, as sparks of fire, flashes, floating specks or spots resembling flies, cobwebs, light shadows, &c., (*metamorphopsia*). 2. It may change the color, form, and number of objects presented to the eye: thus in plethora and internal ophthalmia, objects sometimes appear of a red color; and during the first few days of jaundice, they are said to be colored yellow; in certain neuroses, in some forms of amaurosis, and in incipient cataract, only one half or a portion of the object is visible: this is called *hemiopsia** (*visus dimidiatus*); in other cases they appear double: this is diplopia† or double vision (*visus duplicatus*), which is ordinarily only observed when the two eyes are open; in a very remarkable case related by *Maurice Hoffman*, however, it persisted when one

* ESQUIROL, *des Illusions chez les aliénés*, a paper read at the Académie des Sciences, 1832

† Ημισυς, half; οπτομαι, I see.

‡ Διπλος, double; ὤψ, eye.

eye was closed. * This affection rarely exists, without strabismus; if the want of concordance of the optic axes be not at first apparent, it will become evident if the patient be directed to turn his eyes successively to the right and left, and upward and downward.

B. The *hearing* becomes frequently acute in meningeal inflammation, &c.; obtuse in typhus and grave fevers; it is not entirely abolished except in diseases of the ear, as chronic otitis with caries, and perforation of the tympanum, lesions which not uncommonly occur after variola, typhoid fever, and in the latter stages of phthisis pulmonalis. The hearing may be perverted in two ways; in one case, the patient imagines he hears sounds, which have no existence, as beatings, tinnitus, the ringing of bells, the noise of the wind, the murmur of water, the music of some instrument, words and even speeches; in the other, he does not properly appreciate the sounds which he really hears, they appearing to him more acute or grave than they really are; and he does not recognize the voice of his friends.

C. The exaltation of *smell* has been observed in the neuroses and some other diseases. Bally relates that when suffering from yellow fever at St. Domingo, he distinguished, in the cold water which he drank, the odor of the flowers which grew upon the banks of the stream from whence it was drawn. Diminution of this sense is much more frequently observed, as in coryza, ozæna, and all the acute diseases in which the pituitary membrane becomes deprived of its moisture. If this membrane be entirely dry, the sense of smell no longer exists. In some cases of ataxic fevers, and in the lighter forms of hysteria, the patient complains of smelling odors which in fact do not exist, or perceives in substances a different smell from that which belongs to them.

D. The *taste* is rarely exalted in disease; this symptom has however been observed in the neuroses. It is diminished in nearly all acute affections, and often suspended in the last stage of grave fevers in which patients take without repugnance the same remedies which had before excited nausea from having merely swallowed them. This sense also presents other anomalies; some patients perceive an acid, bitter, saltish, coppery, or putrid taste in all their food, whether liquid or solid; to others, substances which are disgusting or insipid, have a delicious flavor, while food of a superior flavor is to them positively disagreeable. This symptom is particularly observable in hysteria.

E. The *touch*, taken in its most limited acceptation, rarely furnishes many remarkable symptoms; it may be diminished or abolished; it is rarely depraved. *Sarcone* remarked, in the epidemic of Naples, that, of all the senses, this was least affected.

* *Ephem. Natur. Curios.*, vol. ii., obs. 1.

Taken in a more general sense, this sense may be exalted in the whole or a part of the body, as in general nervous affections, and in local phlegmasiæ. It becomes more or less diminished, or completely abolished, in apoplexy, *paralysis of sensation*; it may be perverted, the patient incorrectly appreciating real sensations, or experiencing those which are imaginary, as in the sensation of a drop of water falling upon some part of the body, a pin penetrating the skin, or the crawling of some animal over the body; but these last phenomena belong to hallucinations, as well as to illusions of the senses, and constitute one of the signs of a disordered intellect.

SECTION FIFTH.

Symptoms furnished by the Affective Functions.

These functions, in health, present the greatest variety in different individuals.

Disease almost always produces a degree of sadness or impatience, ennui or inquietude. All these effects may be produced simultaneously, or successively, but in most cases, the derangement of the affective functions is more manifest. They are sometimes *exalted*, as is observed in hypochondriacs; patients thus affected are at once susceptible of the strongest attachment and the most profound hatred; the least evidence of good will affects them to tears, and on the slightest occasion they will form the blackest suspicions. In others, the opposite is observed; they appear indifferent to their own fate, and that of their nearest friends; in some cases of typhoid fever and mania, the moral sensibility is almost entirely *abolished*. The character and affections may be *perverted*; persons who in health are the most amiable, become peevish; those most imperious and obstinate, docile; the most resolute, pusillanimous; and the timid, resigned and even courageous, under the influence of disease. This has not escaped the observation of those unconnected with the profession, and it is a common remark, that those who in health are the most amiable, are the *worst patients*. Disorder of the moral affections is still more manifest in some individuals, who, during a part or the whole course of a disease, take an aversion to their nearest and most intimate friends. This symptom is not unfrequently observed in hypochondriasis and mania.

SECTION SIXTH.

Symptoms furnished by the Intellectual Functions.

The intellectual functions relate principally to the attention, memory, imagination and judgment; these presenting, in health, infinite varieties, and, in disease, being susceptible of numerous alterations. In some cases, there is perversion of the judgment and imagination, while the attention and memory remain unaffected; in others, the memory is alone at fault; but generally all these functions are simultaneously deranged.

Exaltation of the intellectual powers is a prominent symptom in some patients, and particularly in melancholics; we are often struck with the clearness and surprising accuracy of the memory by which they are enabled to recollect events long since forgotten, the appropriateness and precision of their language, their rapidity and strength of judgment, and fertility of imagination, in short, a degree of intelligence far surpassing that which they ordinarily possess when in health. Nor is it rare to observe an extraordinary development of the intellectual functions, connected with exaltation of the moral sensibility, in acute disease about to terminate fatally. The dying often speak with an eloquence which they were not before known to possess, and express sentiments which they did not appear susceptible of experiencing.

The intellectual functions are more often enfeebled than exalted in disease. This diminution of the intellectual powers, occurs in most diseases, particularly those of an acute character. It is principally in typhus that this symptom is noticed; it is difficult to fix the attention of the patient; he comprehends with difficulty the questions that are put to him, replying slowly, and having but a vague idea of what is going on around him, the place where he is, or his relations to those about him; his physiognomy is not in harmony with surrounding circumstances; his attention is not directed towards the object that excites it; his features are without expression, and the body remains in one posture.

There is an entire absence of the intellectual faculties in idiocy, and those diseases, in which there is a suspension of all the functions of relation, as violent apoplexy, and epilepsy.

Perversion of one or more of the intellectual or affective faculties constitutes *delirium*.*

This affection is more likely to occur during childhood and youth than at any other period of life, and in persons of great nervous susceptibility. There are some individuals, in whom a slight indisposition, or febrile attack, is accompanied with this affection. But this symptom does not generally occur, except in severe acute diseases, or in chronic affections when drawing towards a fatal close.

* *Delirium*, *de*, from; *lira*, ridge between two furrows.

Delirium does not alone occur in affections of the brain and its membranes; it is more often observed, as a sympathetic phenomenon, in the thoracic and abdominal phlegmasiæ, eruptive fevers, the various kinds of typhus, and in typhoid fever. It is with the brain as with the heart, these two viscera being associated with the affections of all others, and the disturbance of their functions being generally sympathetic. This subject will be again considered in the chapter on diagnosis.

Delirium may present itself under various forms; it generally appears in the relations of the patient with *external* objects, in his gestures, actions, and in the words by which he expresses his ideas of surrounding circumstances; but there is also an *internal* delirium, sometimes observed, which depends solely upon disorder of the cerebral functions, and is not excited by any external circumstance; it is characterized by *muttering*, carphologia, automatic gestures, conversations with absent persons, &c.

There is a state of complete delirium in which the order of ideas and moral affections is entirely perverted, the patient being continually in error on every subject; this is observed in mania. In other cases the disease affects but a single idea. This is particularly observable in monomania, (melancholy of Pinel,) the patient entertaining erroneous ideas, as to his rank, the place where he is, and the passage of time; and consequently speaking and acting in accordance with this error. In complete, as in partial delirium, there is sometimes a predominant idea, which almost always relates to the habitual occupation of the patient, as is particularly noticed in coachmen, errand boys, &c. It has been observed that in those cases which present a predominant idea, it is almost impossible to dispel it, or to excite others in its place.

Delirium may be constant, or transient; in the latter case it may recur at regular intervals.

The two principal varieties of this affection, which have been particularly described by authors, are the *mild* or *tranquil* and *furious delirium*.

Mild delirium (*subdelirium*) can, in some cases, only be distinguished by a change in the gestures, actions, and language of the patient; he tosses his arms to and fro without any determinate object; tries to get out of bed, or uncover himself; he at one time, preserves an obstinate silence (*taciturnetas*), and at another, talks incoherently (*vaniloquium*) or mutters unintelligibly between his teeth. We have seen a case in which delirium could only be distinguished by the plaintive cries constantly uttered by the patient. To most questions which were put to him, he replied promptly; but when asked why he thus complained, he appeared unable to comprehend the question. Mild delirium may also show itself, by a more or less marked alteration in the physiognomy, sound of the voice, and in the mild, or severe, free, or respectful mode of expressing himself, being not in accordance with the usual manner of the patient. It is not uncommon for them to speak harshly to those whom they have generally treated with respect, and *vice*

versa, having no recollection of the circumstance after recovery. In the case of a young man sick with typhus fever, who was under our care, the patient nearly recovered his senses about the twelfth day, the only evidence of any remaining delirium being the familiar tone with which he addressed an old friend of his family for whom he had always shown proper respect. Tranquil delirium should not be confounded with those distressing dreams which occur during sleep, and which cease upon arousing the patient.

Furious delirium presents itself under a totally different form; the patient shouting, singing and uttering threats; talking in the most obscene and extravagant manner, railing against absent persons, quarreling and trying to leave his bed, throwing from him any object he can lay hold of, spitting upon, and striking his assistants, &c. The same patient may be alternately affected with mild and furious delirium. In the epidemic of Naples, according to *Sarcone*, furious delirium ceased during the remission; but the patients abandoned themselves to the most frightful despair, turning their eyes with a suspicious air upon their assistants, fearing to read in their countenances the unhappy fate with which they believed themselves threatened; the least sign of affection caused them to weep and tremble with fright.

Delirium presents other varieties, according to the difficulty of its cure. If it be light, it is perceived by the patients themselves, who endeavor to correct their own judgment. If the delirium be still more apparent, they may still have a desire to overcome it, but the difficulty is greater; at this time the physician may correct, at least for the moment, the ideas of the patient, and obtain sensible answers; but the amendment is but transient, and the delirium soon returns. When it exists in a still higher degree, nothing can suspend it, even momentarily.

The duration of delirium is very variable. It may last for a few minutes only, or continue for weeks, months, and even years.

After recovery from this affection, patients are often unable to recall anything that has occurred, not even what appeared to have been the result of reflection; in other cases, they have a confused and even clear recollection of what they have experienced.

SECTION SEVENTH.

Symptoms furnished by Sleep.

The usual duration of healthy sleep, is nearly uniform in each individual; it is tranquil, and refreshes the wearied body. In disease, it may be prolonged, diminished, suspended or disturbed, and fails to restore strength.

It is prolonged in certain diseases accompanied by cerebral congestion, and diminished in nearly all acute affections. The com-

plete suspension of sleep or *agrypnia* * (*insomnia*, *pervigilium*) may occur in a great number of diseases, and from various causes, such as intense pain, *tinnitus aurium* and other imaginary sounds, difficulty of respiration, frequency of cough and of the excretions, restlessness, mental agitation, violent passions and nocturnal paroxysms. Complete sleeplessness is one of the principal symptoms in "*delirium tremens*;" it is also a marked symptom in typhoid fever; for, in no other acute disease, is it so complete and constant. Sleep may be disturbed by night-mare, dreams, &c.

Nightmare (*incubus*),† *ephialtes*‡ *oneirodynia*,§ consists in a feeling of suffocation, which supervenes during sleep, producing a momentary but inexpressible anguish, and causing the patient to start and awake in terror. The person, who experiences this symptom, feels a sensation of great weight on his chest, imagines that some danger threatens him, or that he is pursued by a phantom; he makes ineffectual efforts to escape from his imaginary dangers and to cry for help, and when he awakes is often bathed in perspiration. This symptom is particularly noticed in hypochondriasis and in cardiac aneurism, and may sometimes arise from indigestion.

Most of the physicians of antiquity paid great attention to dreams; they supposed that during sleep, that is, when the operations of the mind are undisturbed by any external sensation, the suffering of the diseased organ is more distinctly felt, producing in the *sensorium commune* a disposition to certain dreams. This opinion is true, to a certain extent. In diseases accompanied with great difficulty of respiration, the patient imagines that the dilatation of the chest is prevented by the pressure of a considerable weight upon it. *Galen* mentions a man who dreamed for a long time, that one of his legs had become petrified; a short time after, the limb became paralytic: the transient numbness which often precedes paralysis, sufficiently explains this phenomenon. It was more justly thought that ill nourished persons dreamed of eating certain articles of food. It has been pretended that in plethora and inflammatory fevers, patients perceive in their dreams, bodies of a red color; that those suffering from dropsy, dream of water, streams, &c.; but these assertions do not accord with observation.

In general, when occurring in disease, dreams are wearisome and painful. They may present to the imagination, obstacles, precipices, fires, in short, any object of embarrassment and terror, sometimes causing the patient to awake suddenly in a state of fright.

It is said that the Egyptians and Greeks placed their sick in the temples, that the gods might make known to them, in their dreams, the proper method of their cure. Now that the age of superstition has passed away, no one believes these salutary dreams to be the inspiration of heaven; but respectable persons do not hesitate to

* Ἄγρυπνα, chase; ὕπνος, sleep.

† *Incubus*, from *incumbere*.

‡ Ἐφιάλτης, from ἐφάλλομαι.

§ Ονειροδύναμις, dream; ὀδύνη, pain.

accord to the disciples of *Mesmer*, the power of giving, with the magical sleep produced by their manipulations, the knowledge of every disease and its appropriate remedies.

Lastly, the sleep of invalids does not restore the vigor of the frame; and in some affections, the paroxysms of which occur in the night, the symptoms are of a more aggravated nature in the morning after a disturbed slumber, than towards the close of the day, after twelve or fifteen hours of wakefulness.

Somnolency or *drowsiness* (*somnolentia*) is a state intermediate between waking and sleeping. It is often observed in typhoid fevers and in certain cerebral affections.

Topor or *cataphora** is a dull and heavy sleep, from which the patient can with difficulty be roused: this phenomenon occurs in the same diseases as somnolency.

Coma† is a still more profound sleep, from which it is more difficult to awaken the patient. Of this there are two varieties: 1. The *coma vigil* (*coma agrypnodes*), which is accompanied by delirium, the patient keeping his eyes closed, excepting when spoken to, muttering to himself, and frequently changing his position; 2. *coma somnolentum*, in which the patient speaks when aroused, but remains silent and immovable in the intervals. These two varieties are frequently observed in typhoid fevers.

Lethargy‡ (*lethargus, veternus*) is a constant and still more profound sleep, from which however it is not impossible to awaken the patient; but when roused from this state he forgets everything he has said, and appears unconscious of what he is saying, speedily relapsing into his former condition.

Lastly, *carus*|| consists in complete insensibility, from which nothing can arouse the patient, even for a few instants: these different symptoms most generally occur in the last stage of cerebral diseases, or in cases of concussion or sudden compression of the brain.

Topor, *coma*, *lethargy* and *carus*, are somewhat analogous to sleep, only differing as it were in degree. It is for this reason, that they have been considered in connection with somnolency.

SECTION EIGHTH.

There are three other symptoms in which the functions of relation are particularly affected, and to which we ought, perhaps, to allude before passing to the consideration of the disturbances of the internal functions; these are *lipothymia*, *syncope*, and *vertigo*.

Lipothymia || or *lipopsychia*, ¶ consists in an almost entire sus-

* Καταφορά, fall; καταφερομαι, I fall.

† Κῶμα, profound sleep.

‡ Λήθη, oblivion; αργος, idleness.

|| Καρὸς, profound sleep.

§ Λεῖπω, I leave; θυμός, mind.

¶ Λειψω, idem; ψυχή, soul.

pension of all the functions, with discoloration of the face and *relaxation* of the limbs. Respiration and the circulation continue, but are hardly perceptible. This symptom, when slight, is called *fainting* (*animi deliquium*).

Syncope * presents the same phenomena, together with a more complete suspension of the respiration and circulation. Syncope, lipothymia and fainting may occur in consequence of acute pain, or lively emotions, copious bloodletting or abundant and painful stools. The ingress of air into the circulatory system, during a surgical operation, may occasion fatal syncope. This symptom is not unfrequently observed at the commencement of eruptive fevers, in the course of pestilential fevers, in gangrenous affections and cases of profuse suppuration. The periodical return of this affection constitutes one of the severest forms of malignant intermittent fever. It is not uncommon at an advanced period of chronic diseases, and in persons very much reduced in strength, it often precedes sudden death.

Vertigo (*vertigines*) produces in the patient a sensation of *turning*, or gives to external objects the appearance of *rotation* around him; this sensation is almost always accompanied by palpitation of the heart and a feeling of faintness. *Vertigo tenebrosa* † (*capitis omnubilatio*) is the term applied to that variety in which the sight becomes obscured as if by a cloud. This affection occurs at the commencement of many severe acute diseases, often returning during their course, particularly if the patient execute any movement, as in attempting to sit down or rise up. Vertigo, accompanied with a sudden loss of consciousness and soon followed by headache with a feeling of debility and heaviness, constitutes a form of epilepsy, apparently lighter, but more frequently followed by mental alienation, than the more common form of that disease.

ARTICLE SECOND.

Symptoms furnished by the Internal or Assimilative Functions.

WE have now considered the principal derangements presented, in disease, by the functions which serve to establish the relations of man with external objects. We shall next proceed to the examination of those furnished by the internal functions, digestion, respiration, the circulation, calorification and the secretions.

* Συνοπτω, I fall down.

† *Vertere*, to turn.

SECTION FIRST.

Symptoms furnished by Digestion.

In health, the appetite returns at regular intervals, its gratification is attended with pleasure, the thirst is moderate, the stomachic digestion effected with freedom, without eructation or oppression, the fæcal matters are of proper consistence, in quantity proportionate to the food, and their excretion is accomplished without pain. Each of the organs which contribute to the performance of this function presents a healthy appearance; the teeth are white, smooth, and firmly implanted in their alveoli; the gums are firm, smooth and of a pale red color; the inner surface of the mouth is moist and of a reddish hue; the abdomen, in which is contained most of the digestive apparatus, is of its natural size and suppleness.

Under the influence of disease, every act of digestion, and all the organs which contribute to its performance, present more or less marked derangements, which we shall consider in the order of their succession.

A. *Hunger*, the *appetite* or the desire of taking food is seldom increased in disease: this symptom is, however, sometimes observed in mania and verminous affections. In some cases, hunger is so urgent, that unless it is satisfied, fainting ensues; this is called *boulimus*,* a phenomenon of common occurrence in hysteria, but still more frequently observed during pregnancy. In other cases, the patient eats with voracity until the stomach relieves itself by vomiting; this is called (*fames canina*)†. In other diseases, the food which is devoured with greediness, is almost as soon expelled by the anus; this has been called (*fames lupina*)‡. The two latter symptoms are of rare occurrence.

Diminution of appetite (*dysorexia*)§ accompanies nearly all the acute and chronic diseases of moderate intensity.

In those of greater severity, and particularly in acute diseases attended with violent febrile symptoms, the appetite is entirely lost; this is termed *inappetentia* or *anorexia* ||. An entire and prolonged absence of appetite, and progressive emaciation, are sometimes the two only symptoms indicative, in adult age, of chronic disease of the stomach.

In certain chronic diseases, the appetite is *unequal* to a remarkable degree; the patient being one day affected with insatiable hunger, and the next, suffering from complete anorexia, this alternation sometimes occurring the same day.

* *Boû*, augmentative particle; *λιμος*, hunger.

† *Canis*, dog.

‡ From *lupus*, wolf.

§ *Αυς*, with difficulty; *ὀρεξις*, appetite.

|| A privative, *ορεξις*, appetite.

In others, the desire of food is not real; this is commonly called a *false appetite*. In these cases no sooner does the patient taste his food, than he feels already satiated; this is particularly observed in phthisis.

The appetite may become depraved in two ways. 1. There is *disgust* (*cibi fastidium*, *apositia*)* or aversion for food. Disgust should not be confounded with anorexia: the latter is only an entire absence of appetite, while the former consists in real repugnance for food. This repugnance is sometimes so great, that the sight of food, or the mention of its name, is alone sufficient to produce nausea. It is of rare occurrence except in grave diseases, while anorexia accompanies the slightest disorder. 2. The other variety of depraved appetite, is that in which an almost general loathing is combined with a desire for some particular article of food; if this substance be eatable, the symptom is called *malacia*†; if, on the contrary, it be not eatable or noxious, it constitutes *pica*‡. Both these symptoms frequently occur in hysteria and mania, and often in pregnancy. In connection with these affections of the appetite, may be mentioned the sensations of bitterness, clamminess, dryness of the mouth, experienced in many diseases, and particularly in febrile affections and gastric disorder.

B. The *thirst* is increased in most acute diseases, and particularly in diabetes. It is rarely diminished, and more rarely abolished in patients whose intellectual faculties remain unimpaired. In the derangement of the ideas and sensations, accompanying delirium, the absence of thirst and refusal to drink exist together with other phenomena.

C. The examination of the different parts of the mouth, furnishes us with important symptoms. We have before described the morbid appearances presented by the lips, and now proceed to consider those furnished by the teeth, gums, tongue, internal surface of the cheeks and back part of the mouth.

The symptoms furnished by the teeth, may depend upon some affection of these organs themselves, or be connected with the existence of other diseases.

In certain acute affections in which the secretion of the mucous membranes acquires a remarkable degree of acidity, the teeth become the seat of a peculiar sensation, in which they are said to be *set on edge*, (*dentium hebetudo*); this phenomenon is sometimes observed in continued fevers.

The teeth of the lower, in gliding upon those of the upper jaw, produce a *grinding* sound (*stridor dentium*), a symptom which accompanies some acute cerebral affections; in other cases, as in the cold stage of intermittent fever, there is what is termed *chat-*

* Ἀποστροφή, aversion for food.

† Μαλακία, softness.

‡ Pica or Κίσσα, magpie, its opposite colors form a contrast analogous to that afforded by the depraved, when compared with the natural, appetite.

tering of the teeth (*dentrum collisus, crepitus*), in which the teeth strike rapidly against each other. According to some authors* the force with which the teeth sometimes come together is sufficient to fracture them. In scorbutic affections, mercurial stomatitis, and simple chronic engorgement of the gums, the teeth sometimes become loose and even entirely detached from their sockets. Lastly, in chronic diseases they appear elongated, owing to the shrinking of the gums which is coincident with the general emaciation.

A thorough examination of the teeth is important, as many affections of the mouth are often produced and kept up by a decayed or falsely directed tooth. Among others, may be mentioned caries and necrosis of the maxillary bones, odontalgia, fistula of the face, and enlargement of the lymphatic glands of the neck, which may be owing to no other cause than dental caries. Aphthæ, ulceration of the mucous membrane of the mouth, and particularly of the tongue, with hardened and inverted edges and a greyish and fungous surface, are not unfrequently caused by the inequalities of a broken or wrongly directed tooth.

The *gums* present some important changes: they are swollen in mercurial salivation and scurvy; in the former case, they are red, in the latter, blackish and flabby; in both cases, they exhale an odor *sui generis*. It has been remarked by *M. Rostan*, at the Salpêtrière, that after loss of the teeth, and when the gums had become callous from mastication, swelling did not take place in them to the same degree as before; and if the teeth of one jaw be lost, while those of the opposite remain, the gums of the latter become swollen, while those of the former retain their usual appearance.* The gums become pale in diseases of debility, and particularly in passive dropsies; they are of a redish brown color in some anginose affections.

The state of the tongue, in disease, has always, and very justly, claimed the attention of physicians. The importance of the signs which it furnishes, has, it is true, been much exaggerated; but if they be reduced to their true value, the tongue furnishes semiology with numerous interesting facts.

In health, the tongue is generally of a red color, smooth surface, slightly granulated towards its apex, and covered with pointed villosities and hemispherical glandules towards its base; its surface is moist, it is free in its movements, the object of which is principally in speaking, mastication and deglutition. In chronic diseases, even in those of the stomach, the tongue often remains in its natural condition; this is sometimes the case in acute diseases; and this phenomenon which is without value in the first, is generally a favorable sign in the latter case, provided the other symptoms be not unfavorable. Under the influence of disease the tongue presents changes in relation to its volume, form, movements,

* *De recondita Febr. int. tum. remit.*; *Natura*, p. 43.

† *Cours de Med. Clin.*, t. 1, p. 250.

color, moisture, coats, eruptions of which it is sometimes the seat, and lastly, its temperature and tactile and gustatory sensibility.

The volume of the tongue becomes rarely increased in affections of which it is not the special seat. In some acute diseases, however, this organ becomes so voluminous as to fill the whole mouth, preserving the impression of the teeth upon its surface. This phenomenon should lead the physician to suspect the influence of some mercurial preparation. At other times swelling of the tongue is in consequence of violent angina; it is in these cases owing to stagnation of blood in this organ; it is always a symptom indicative of great danger.

Shrinking of the tongue is a frequent symptom in typhus and other grave fevers; it is at the same time in a state of dryness and tremor, conditions equally unfavorable.

In marasmus, the tongue rarely becomes diminished in size. But a single example of partial atrophy of this organ has been recorded. This case, mentioned in the forty-fourth bulletin of the anatomical society, relates to a man, one half of whose tongue was pale, discolored, wrinkled and atrophied without any change in its sensibility. The patient died with symptoms of paralysis, and the autopsy revealed an hydatid cyst in the left occipital fossa which compressed the glosso pharyngeal nerve.

The *form* of the tongue, in disease, presents remarkable varieties; it becomes in some cases, conical, in others, pointed. The latter modification has been recently pointed out as peculiar to inflammation of the stomach, but this is not in accordance with the results of experience. These peculiarities in the form of the tongue do not indicate with certainty the nature and seat, more than the danger of the disease. The pointed form depends solely upon the mode of contraction of the intrinsic muscles of the organ.

Difficulty in the motions of the tongue either in the articulation of sounds, or the act of protruding it, is a frequent symptom in the course of grave fevers; this condition is always an unfavorable sign.

In some cases of hemiplegia, when the tongue is thrust out of the mouth, its point appears drawn away from the paralyzed side; it has been attempted to explain this phenomenon by supposing paralysis of the genio-glossus and stylo-glossus muscles. But this deviation is often but apparent; its point being nearer one commissure than the other, the tongue is supposed to deviate from its right direction; but it is the commissure, not the tongue which is affected.

Paralysis of the tongue whether it consist in the deviation of its point, or is apparent from the difficulty in pronunciation and mastication, constitutes, in all cases, an important diagnostic sign, as it is an almost certain index of a cerebral lesion.

The color of the tongue may be altered either immediately and by a change in the color of the organ itself, or mediately, by the coat with which it becomes covered. Paleness and discoloration of the tongue rarely occur except in cases of chlorosis and anemia.

In organic affections of the heart it partakes of the lividity of the neighboring parts.

The coats which form upon the tongue are generally confined to its superior surface, and are of various colors. Those most commonly observed are white, yellow, greenish, brownish and black. These coats may be thick or thin, tenacious or easily removed, dry or moist, of uniform or unequal extent, disposed in patches, or presenting undulations analogous to those observed on geographical charts. These coats, it would appear from the chemical analysis of *Vauquelin*, *Laugier* and *M. Denis*, have the same origin with the dental tartar. According to others, they are formed by the drying of the salivary fluid.

Whenever the surface of the tongue presents one of the above-mentioned coats, some morbid condition generally exists. I say generally, for there are many persons in whom abstinence alone produces a whitish coat; and in others, this is constant at all times in the day, although their health, in other respects, is perfectly good. There are others, as we have before mentioned, who, being obliged to sleep with the mouth open on account of the natural straitness of the nasal fossæ, awake with a dry and often yellowish tongue. With these exceptions, a coated tongue almost always indicates disease. There are others in whom the superior surface of the tongue receives and preserves the color of the food and drinks taken, becoming of a dark livid hue by the contact of red wine, and colored drinks and food generally, as syrups prepared from red fruit, chocolate, &c. But this aptitude of the tongue to receive and retain coloring matters rarely occurs except in disease, when the villousities of the organ become impregnated with the colors with which they are brought in contact.

Are we to believe with the physicians of antiquity that the state of the tongue is a true index to that of the stomach? Is it true that a yellowish, or greenish coat upon the tongue, is indicative of bile in the stomach; that a blackish coat should cause us to fear the presence of putrid matters in the digestive passages? Lastly, are we to suppose with *Broussais*, that redness of the tongue is a pathognomonic sign of gastritis? Accurate observation has long since shown the entire inconsistency of these various assertions with facts. Thus, it was found by *M. Louis*, in analyzing a great number of cases, in his researches on phthisis, that redness of the tongue existed in an equal number of patients in whom the stomach was found healthy, with those in whom this organ presented a grave lesion. The researches of the same author upon typhoid fever led to nearly the same results as to the state of tongue in the course of that disease. Indeed, whatever aspect this organ presented, no correspondence between it and that of the stomach could be detected, being the same in those cases in which there was a grave lesion of the mucous membrane of the stomach, as in those which presented a healthy appearance. According to the skilful observer whom we have just cited, the blackish color,

roughness and cracked appearance of the tongue, are chiefly owing to the intensity of the febrile action, whatever be its cause.

The tongue may preserve its natural moisture and suppleness, although its surface at the same time be covered by white, yellow, or greenish coats; but is constantly dry, or clammy, when loaded with a blackish, or brownish fur. Dryness of this organ is more or less considerable; it may be also partial or general. When existing in a slight degree, it is only apparent from the sensation experienced by the patient, and a kind of noise which accompanies the motions of the tongue, and which is owing to the detachment of this organ from the parts of the mouth, particularly the mucous membrane of the palate, to which it was adherent. The finger placed upon the tongue and drawn slowly over its surface, seems to be gently retained by a viscid substance. This is rather a simple diminution in the degree of moisture, than a state of dryness. In a more advanced stage, the coating is more viscid; the tongue in this case is said to be *pitchy* (*poisseuse*). Lastly, when this phenomenon is still more marked, the organ is completely deprived of moisture. Dryness of the tongue sometimes occurs only during sleep, disappearing when the patient awakes, or after he has taken liquid food; at other times, it continues during a part of the day, or for several days. In the latter cases, it becomes also smooth, shining and red, or rough, wrinkled and black. This condition of the tongue, in acute diseases, is generally indicative of danger. If it occur in the course of a chronic disease it almost always announces approaching death.

A phenomenon of great importance in semeiology, is the existence of whitish and yellow patches or pimples, often confluent, sometimes disposed in the form of a *pultaceous coat*, and sometimes in thin and reticulated, or thick and opaque membranes, which are alternately detached and reproduced, generally appearing simultaneously or successively upon the upper surface and sides of the tongue, the internal surface of the cheeks and the velum pendulum palati and its pillars. The appearance of these patches is of little importance as a diagnostic sign, for it belongs to no particular disease, but is of great utility in prognosis. In chronic diseases, it is an inauspicious omen, particularly if the eruption last beyond a certain number of days, or is reproduced many times. In acute affections, though not so grave a sign, it may with other symptoms lead us to fear the result. The same eruption occurs temporarily, particularly in old persons, without any derangement of the health; its semeiotic value is not the same in these cases as when occurring in the course of a grave disease.

The superior surface of the tongue sometimes presents, particularly towards its apex, very small red spots, considered by M. Roux as a certain sign of the existence of syphilitic virus. We only call the attention of observers to this sign, the value of which we have not as yet been able to appreciate. The grayish ulcerations which sometimes appear upon the edges and point of the tongue, and which should not be confounded with those occasion-

ally produced by inequalities of the teeth, are of syphilitic origin, as their appearance indicates. The same may be said of those flat, hard, circumscribed tumors of a red or grayish color, from two to five lines in breadth, which appear upon this organ, and arise from the same cause.

Lastly, the transverse and often irregular cicatrices which the surface of the tongue sometimes presents, should lead us to suspect epilepsy, the existence of which is often concealed from the physician. This may, consequently, become in some cases a highly important sign.

A change in the *temperature* of the tongue becomes rarely sufficient to claim the attention. In the last stages of acute or chronic disease, it may become *very cold*, a sign indicative of approaching death. In cholera, the coldness of the tongue was an almost constant symptom, and in many cases in which it occurred, the patients recovered. It is perhaps unnecessary to add that this phenomenon would be without value, if the patient had just before taken ice or cold drinks.

In the course of certain cerebral affections, and in those diseases which affect the nerves distributed to the tongue, the tactile or gustatory sensibility of this organ may become diminished. From the experiments of physiologists, confirmed by pathological observations, it would appear that paralysis of sensation is the result of a material lesion of the lingual nerve.

The parts which form the *posterior part of the mouth*, are also the seat of symptoms appreciable to the sight; they may become swollen, red, dry, and ulcerated. The *velum palati* may be depressed by an abscess in its substance, or by a tumor developed in the nasal fossæ; it may be partially destroyed or perforated by an ulcer. It has been observed to deviate to the right or left in some cases of facial paralysis. The *uvula* may deviate from the median line, become pendent, infiltrated, or entirely destroyed. The brown or blackish coat sometimes observed upon other parts of the mouth, extends also to this; aphthæ often manifest themselves here; and it is generally upon the velum, sometimes upon the tongue and inner surface of the cheeks, that those whitish patches which occur in the last period of chronic diseases, and which announce a fatal termination, appear.

D. *Mastication* is often difficult and painful in disease. Odonotalgia, swelling of the face, dental caries, rheumatism of the tempero-maxillary articulation, fracture of the maxillary bones, dislocation of the lower jaw, are all diseases which may render mastication impossible. To these may be added, disease of the gums, tongue, and cheeks, the integrity of which is necessary to performance of this function.

E. *Deglutition* appears to be more rapidly performed in some acute affections, the patients swallowing the contents of a cup presented to them almost instantly; it is slower and accomplished

with difficulty in nearly all the diseases of the pharynx and œsophagus, as angina, paralysis, and schirrus; the existence of a neighboring tumor compressing the pharynx or œsophagus, the presence of a foreign body in these passages, hysteria, grave fevers, diseases of the brain and upper part of the spinal marrow, are all affections in which deglutition may become difficult. Difficulty of deglutition has been designated *dysphagia*.* It presents many remarkable varieties. Some patients can swallow liquids, but are unable to swallow solid substances; this is often observed in angina; in other diseases, as paralysis, the deglutition of solids can be accomplished, while that of liquids is impossible. These opposite phenomena have been satisfactorily explained; in angina, the inflamed mucous membrane cannot bear the contact of a solid body, while in paralysis the muscles of the pharynx being enfeebled in their action, cannot contract with sufficient force, to conduct liquids from the mouth to the œsophagus, but can act upon a more voluminous and consistent body as the alimentary bolus.

Morgagni,† according to a dissertation of *Spies* on deglutition, speaks of a singular variety of dysphagia observed in an old man: this person was able to swallow all kinds of food, but the last alimentary bolus remained in the œsophagus till the next meal, unless rejected by the mouth, during the interval, in the effort of coughing. In the explanation of this phenomenon, *Morgagni* supposed that the action of the muscles of the œsophagus alone, was insufficient to force the bolus from the pharynx into the stomach, which could only be accomplished by the weight of another bolus, together with the contraction of the œsophagus. This disorder of deglutition he very ingeniously compared to a similar lesion presented by the excretion of urine in old persons; the bladder being incapable of emptying itself completely of the urine it contains.

Deglutition may become *impossible* from causes analogous to those which render it difficult.

The absolute impossibility of swallowing liquids, together with a horror for every kind of drink, constitutes *hydrophobia*,‡ a symptom which generally occurs in rabies and sometimes in typhoid affections and hysteria. When this symptom exists, the sight of water, or of any shining body, often occasions convulsions almost tetanic in their nature.

Deglutition may be depraved in two ways: 1, there may be continual efforts to swallow, with successive action of the muscles destined to this purpose, while the mouth remains empty; this has been observed in elongation of the uvula and some nervous affections; 2, food carried into the posterior part of the mouth, instead of being transmitted directly into the œsophagus, may pass either into the nasal fossæ, as is the case in diseases of the velum, or

* *Δυσ*, with difficulty; *φαγω*, I eat.

† *De Sedibus et Causis mort.*, epist. 1, art. 14.

‡ *Ἰδρῶς φοβία*, from *ἰδρῶς*, water; *φοβός*, fear.

into the larynx, a much rarer and more serious phenomenon, and which can only take place in cases of ulceration of the opening of the larynx (*Archives, Septembre 1839, Memoire de M. Barth*), or in the agony and in patients who swallow involuntarily. It is hardly necessary to add that in cases of ulceration, rupture, or wound of the œsophagus, the food may escape from it, and pass into the cavity of the chest.

There is another derangement of deglutition, in which fluids poured into the mouth, are carried by their weight alone through the œsophagus, producing a sound by their fall into the stomach as if poured through an inert tube. This symptom occurs only in the moribund.

F. *Stomachal digestion* becomes rarely more active under the influence of diseases; in maniacs, however, the action of the stomach appears sometimes greater than in health; but in most diseases it is enfeebled, as is apparent from the sense of weight in the epigastrium, and the general uneasiness and aggravation of all the symptoms after a meal. Patients who take no food often experience various phenomena which indicate functional disturbance of the stomach; as nausea, retching, regurgitations, vomiting and epigastric pain.

1. *Nausea* consists in a simple desire to vomit, *retching* (*vomituritie*) in ineffectual efforts to accomplish this object. Both these symptoms accompany many diseases, and particularly those of the digestive organs.

2. Under the term *subsultus præcordiorum*, a peculiar phenomenon has been also described, which consists in a convulsive action of the stomach which prevents the admission of more food, and the expulsion of what it already contains, notwithstanding the efforts of the patient.

3. *Regurgitation* (*regurgitatio*) is the act by which certain gaseous or liquid, rarely solid, substances, rise from the stomach or œsophagus into the mouth, unaccompanied by the efforts peculiar to vomiting. *Renvois* is the term applied to matters thus rejected. Regurgitation may be *complete* or *incomplete*, in the one case, the substances rising into the pharynx and mouth, in the other, being arrested in some part of the œsophagus and again passing into the stomach; it may be *rare* or *frequent*; and lastly, it may afford *relief* to the patient, or cause increased suffering.

The *renvois* or substances rejected by regurgitation may be *gaseous, liquid, or solid*: the gases or eructations (*ructus*) may be inodorous, as is observed in nervous diseases; they may exhale the odor of sulphuretted hydrogen (*decayed eggs*), that of substances last eaten, or be slightly rancid (*nictus nidorosi*),* as in

* The sense of the word *nidorous* is not well defined; it indicates, in its etymological acceptance, the odor of animal matters in a state of combustion; but most authors have employed it to express a repulsive odor.

indigestion. The liquids which rise into the mouth are sometimes insipid; they are sour in carcinoma of the stomach, bitter in bilious disorders, and sharp and burning in pyrosis. Solid matters rejected by regurgitation almost always consist of the remains of the preceding digestion, which have not undergone the necessary elaboration. The *renvois* are generally gaseous or liquid; in some cases regurgitation of both takes place simultaneously. Solid matters are almost always accompanied by a certain quantity of liquid.

In connection with this phenomenon may be mentioned, rumination or *merycismus*,* which consists in masticating, a second time, food carried into the mouth by a sort of antiperistaltic contraction of the stomach and œsophagus. This affection, upon which Dr. Gintrac of Bordeaux has written an interesting treatise, is, in most cases, congenital. It however sometimes occurs accidentally in old persons affected with cerebral disease, in whom there is insufficient mastication together with too great ingestion of food; in these cases, the food rising into the mouth undergoes a second mastication, without occasioning the person trouble or inconvenience.

4. *Vomiting* (*vomitus*) is the act by which substances contained in the stomach are ejected by the mouth, with effort, and in certain quantities.

Vomiting takes place under various circumstances, and may depend upon an affection of the stomach or other parts of the economy more or less remote. It has occurred in gastric derangement, simple indigestion, gastritis, softening and cancer of the stomach. The affections of the various parts contained within the abdominal cavity, in which vomiting is liable to occur, are inflammations and organic lesions of the peritoneum, intestines, liver, kidneys, bladder, cellular tissue of the iliac fossæ, and uterus, intestinal and epiploic hernia, occlusion of the intestines whatever be its cause, hepatic nephritic and saturnine colic, and pregnancy. The thoracic phlegmasiæ, and particularly acute bronchitis, whooping cough and tubercles, produce, in the paroxysms of coughing, obstinate vomiting; some cases of tonsillitis and pharyngitis, and simple œdema of the uvula may produce sympathetic vomiting, which may also occur in certain affections of the brain. In nervous persons, vomiting frequently follows a severe moral or physical shock; various acute diseases, and particularly the eruptive fevers, are ushered in by this phenomenon. From the frequency of this symptom, and from the numerous affections in which it occurs, it becomes highly important for the physician to be familiar with all the circumstances connected with it, and the diseases to which it belongs. We shall again refer to this subject in the chapter on diagnosis.

The matters rejected by vomiting, vary in their nature, consistence, quantity, color and odor.

* *Μηρυκισμος*, rumination.

These may consist of the residue of digestion, as in the attack of acute diseases, mucus, green or yellow bile, various medicinal, and, in cases of poisoning, poisonous substances, &c. They may consist; 1, of liquid or coagulated blood in hæmorrhage of the stomach, which is generally symptomatic; 2, of a brownish, black, pultaceous substance, resembling chocolate or coffee grounds, in cancer of this organ; 3, of pus when an abscess opens into its cavity; 4, of fæcal matters, when, from any cause, occlusion of the intestines has taken place. We saw at the Hotel Dieu a man, suffering from articular rheumatism following dysentery, reject, by vomiting, a bloody and viscid substance, resembling in appearance the sputa in pneumonia. In cholera, the matters vomited resemble rice water or whey; in one case they exactly resembled milk, both in color and consistence. Among them are also sometimes found lumbrici, hydatids and biliary calculi; also portions of cysts, false membranes or tumors which have been detached from the inner surface of the stomach, or some other part of the digestive canal.

The consistence of these matters, is variable; they are generally liquid, sometimes clear and watery, at others, thick, viscid and resembling paste. They are sometimes mixed with a certain quantity of gas or solid matters, as in indigestion. Their quantity may vary; this, in many cases, it becomes highly important accurately to ascertain, particularly in the vomiting of pus and blood. Their color and odor generally depend upon their nature.

Some patients while making the most violent efforts to vomit, reject nothing but gas, which is generally insipid and inodorous, and produced by simple exhalation. This is observed in certain neuroses, and particularly in hysteria. In the single case of *dry cholera*, observed by Sydenham, in the autumn of 1669, there was evacuation of wind from above and below, without any other excretion.

5. The *pain* of which the epigastrium is the seat, varies in its character, type, intensity, and particularly in its causes. Of these, the principal are, inflammation of the stomach, the presence of indigestible or poisonous substances in this viscus, the various organic affections peculiar to it, rheumatism of the muscles of this region, the constriction of a portion of the epiploon in an opening of the linea alba, peritonitis, any affection of the liver or pancreas, an acute or chronic affection of the lungs and pericardium accompanied by a frequent cough, leucorrhœa, habitual pressure on the epigastrium by tight corsets, hysteria, &c. This enumeration, though incomplete, is sufficient to show the error of those who refer all epigastric pain to inflammation of the stomach. There are few grave diseases which may not be accompanied by epigastric pain.

6. Pain in the stomach, of a peculiar character, sometimes occurs, to which the term *cramp in the stomach* has been applied: it is compared by patients to the pain caused by cramp in the muscles of the leg, and generally produces forced flexion of the body forward, during the whole time of its duration.

7. There is still another symptom furnished by the stomach, and to which authors have not referred. This consists of a peculiar sound caused by the fluids and gases contained in this viscus, and which may be produced by a slight blow upon the trunk, or rapid pressure made with the hand over the epigastric region, and several times repeated. This phenomenon occurs mostly in diseases accompanied by distension of the parietes of the stomach, and particularly in cancer of the pylorus. It is sometimes met with in healthy individuals.

G. The symptoms furnished by the intestinal canal are less numerous and more difficult to distinguish. Among these may be mentioned those *internal movements*, sometimes felt in diarrhœa, the *commotion* and *twisting* occasionally experienced by patients at the commencement of dysentery, those various movable pains, of a dull, rather than acute character, sometimes followed by cold sweats and fainting, and which have been termed *intestinal colic* or simply *colic*, occurring in inflammation of different portions of the intestinal canal, particularly the *colon*, lastly, those *partial tumefactions* of the abdomen, produced by the gaseous distension of some part of the intestinal canal, or by agglutination of the intestines with each other, &c. These symptoms need only to be enumerated. There are some others which should be mentioned more in detail; as *borborygmi*, and also those various changes which supervene in the course and excretion of matters and in the matters themselves.

1. The term *borborygmi** is applied to the sound produced by displacement of the gases contained within the abdomen. These noises accompany intestinal disorders and hypochondriasis; they are not unfrequently observed in healthy persons, particularly females, and, as has been before remarked, are often caused by habitual compression of the abdomen.

2. There is another intestinal sound, somewhat analogous to *borborygmi*, but differing in being more moist and generally more circumscribed. We refer to the *gurgling* (*gargouillement*), often heard in intestinal hernia, particularly while employing taxis in its reduction; it is here produced, as in the stomach, and cavities of the lungs, by the concussion of liquid or gaseous matters contained in a cavity. An analogous sound occurs in schirrus contraction and internal strangulation of a portion of the intestines, which aids in their diagnosis. But it is chiefly in typhoid fever that gurgling, which is confined to the cœcal region, and ordinarily accompanied by local pain on pressure, becomes an important sign. Of all acute affections, typhoid fever is the only one in which this symptom exists, being in this disease almost constant, although varying in intensity and duration; it is owing to a peculiar *alteration* affecting the ilio-cœcal valve and the extremity of the small intestines which is peculiar to this disease. In

* *Βορβορυγμός*, from *βορβορῶ*, I make a dull noise.

obscure cases this phenomenon becomes an important diagnostic sign.

3. The course of alimentary matters through the intestinal canal, may be retarded or accelerated, as we shall see hereafter, in referring to their characters. Under certain circumstances, in consequence of grave and rare lesions of the intestines, the alimentary matters may arrive at the termination of the intestinal tube, without having traversed its whole extent. In the examination of the body of an aged woman who died at Salpêtrière, in whom there was disease of the gall-bladder, a large communication was discovered, which permitted the finger to pass from the duodenum into the enlarged gall-bladder, and from the latter into the transverse colon; a yellowish mass which filled these three organs clearly indicated the course of the alimentary matters. Perforations between contiguous portions of the intestine, have been often observed, producing similar results. Patients, in these cases, are in a condition analogous to that produced by an artificial anus.

4. The alvine excretion or defecation (*alvina excretio, defecatio*) is the act by which the contents of the rectum are expelled from the body. This may be more or less frequent than in the natural state, constituting, in one case, *diarrhœa (alvus cita)*, and in the other, constipation (*alvi obstipatio, alvus compressa*).

These two symptoms are so frequent, that there are few serious diseases in which one or the other, and sometimes both successively, may not exist. Constipation and diarrhœa sometimes exist to an almost incredible degree; some patients have been known to have no evacuation for several months; in others, on the contrary, the excretions are so frequent as almost to allow no interval between them. We recollect a patient at the hospital *De la Charité*, who was obliged for several days to keep a vessel constantly beneath him: the excretions were so frequent as hardly to allow sufficient time for the vessel to be emptied of its contents.

Constipation, when habitual, and existing within certain limits, is not a serious, and often not a morbid symptom. There are individuals who do not go to stool oftener than once in eight, ten, or even fifteen days, and experience no inconvenience whatever. It is otherwise, if constipation supervene accidentally in persons not habitually disposed to it, particularly if accompanied with other derangements of health; it is owing in such cases, either to a want of action in the intestines themselves, or to some obstacle to the course of the fœcal matters. In the most aggravated cases of this affection, the contents of the distended intestine, which cannot be excreted, are rejected by the mouth. To this complex phenomenon, marked by obstinate constipation, and the vomiting of the contents of the stomach and intestines, the term *ileus* has been applied. This, which the ancients considered a disease, is in fact but a symptom, and may be occasioned by all the causes capable of producing occlusion of the intestines, as external and internal strangulation, invagination, schirrus contraction, tumors situated either without or within their cavity, a foreign body, and sometimes,

particularly in old persons, a voluminous mass of indurated fæces. The latter cause may produce a kind of hectic fever called *stercoral*, and even death. It is important that the physician be familiar with all the causes capable of producing constipation, and ileus, which is sometimes dependent upon it.

Defecation may be accompanied with pain in the anus or in the abdomen; these pains almost always occur in constipation; they are sometimes absent at the commencement of diarrhœa, but often supervene when this affection has lasted for several days and the evacuations have become very frequent. In certain diseases of the rectum, defecation is exceedingly painful. To this pain is sometimes added a constant and ineffectual desire to go to stool together with a burning and smarting sensation about the anus; this constitutes *tenesmus* or *epreintes* (*desidendi conatus*), a symptom peculiar to dysentery. Tenesmus is sometimes followed by no excretion, sometimes a small quantity of bloody mucus is squeezed out with violent efforts. Tenesmus should not be confounded with the pain excited by the excretion of fæcal matters in persons affected with hæmorrhoids, fissures, or contraction of the anus; in all these cases, the excreted matters are of a healthy consistence; they act mechanically upon the parts, which they irritate, but the desire of going to stool is only felt at remote intervals, and the pain ceases or becomes diminished during the intervals. In tenesmus, on the contrary, the pain and desire to evacuate are constant, and the excreted matters are either remarkably altered or do not exist at all. Tenesmus does not necessarily indicate an affection of the large intestine. It sometimes depends upon pressure exerted upon the rectum, by a tumor in the pelvis, or in the uterus towards the close of gestation. Tenesmus in the male may be also owing to the presence of a calculus, of greater or less size, in the bladder.

Defecation, under some circumstances, takes place independently of the will of the patient. This symptom presents itself under various forms: 1, in some cases of diarrhœa, in which the patient, thinking to expel wind, involuntarily allows the escape of fluid matters; the same phenomenon frequently occurs in schirrus of the rectum; 2, at other times he experiences a pressing desire to evacuate, and the excretion takes place in spite of all his efforts to the contrary; 3, in other cases, it occurs without producing any sensation, and sometimes, even without the knowledge of the patient; this happens in violent acute diseases, and towards the close of chronic affections. This incontinence of fæcal matters, has been also observed in affections of the spinal marrow: involuntary discharge of these matters or of flatus, is often the first index of these diseases.

There are some cases in which the excretion of the fæces becomes otherwise deranged; the fæcal matters are sometimes expelled from the body, before having traversed the whole length of the intestinal canal. Either from the opening of an abscess into the intestinal cavity or a wound of these organs, and more fre-

quently from the occurrence of gangrene in strangulated hernia, there is formed in the place of the wound or hernial tumor, either a small opening called a *stercoral fistula*, through which a part of the intestinal contents pass, or a *supplementary* or *artificial anus*, which gives issue exclusively and uninterruptedly to the fæcal matters.

In some cases, in which the intestine opens into the bladder, these matters are expelled mixed with the urine, but being here also retained by a *sphincter*, the patient is in the same disgusting condition, as if suffering from an artificial anus. In a very remarkable, and perhaps the only, case on record, the fæcal matters pursued a still more extraordinary course. An old woman was admitted to the Hotel Dieu (service of Dr. Husson) in such a state of debility, as to be unable to give any account of her complaints. All that was noticed was that the bed was continually soiled by fæcal discharges. Upon examining the body after death, the large intestines were found completely filled with voluminous *faces*, of a stony hardness, and which must have been retained for several months; upon further examination, it was ascertained that owing to cancerous ulceration, a communication had been formed between the large intestine and the fundus of the uterus, and that all the fæcal matters passed through the cavity of the latter organ and vagina, and ran out at the vulva. The specimen was presented to me by Dr. Husson, the younger, and it has since been exhibited to the students, in the amphitheatre of the Hotel Dieu.

4. The excreted matters or *excrements* (*faces*) present, in disease, numerous alterations, according to their nature, consistence, quantity, color, odor, form, and the foreign substances occasionally found with them.

These matters may be watery, as in the intestinal flux with which *Morgagni* was attacked, and serous diarrhœa; they may partake of a mucous character, resembling the white of an egg or the spawn of frogs, in some cases of chronic colitis; they are bilious in many diseases; their admixture with a certain quantity of chyme, constitutes the *cæliac flux* (*fluxus cæliacus*)* [*chylous diarrhœa*]; they consist of half digested food in *lientery* (*lienteria*)†; they are streaked with blood in some cases of diarrhœa in which the stools are very frequent; blood is uniformly mixed with the mucous discharges in dysentery; it flows pure and liquid from the anus, when it comes from the rectum, and particularly in the hæmorrhoidal flux; it is black and changed when from the stomach, as is often observed after hæmatemesis, in persons affected with cancer of this organ. Liquid blood of a blackish color and very fetid odor, when discharged from the anus in large quantities, and in the course of a continued fever, indicates, almost with certainty, the existence of ulcerations in Peyer's patches, and becomes in some obscure cases a very important diagnostic sign;

* Κοιλια, belly.

† Λειεντερια, from λειος, smooth, and εντερον, intestine.

for among all the acute affections peculiar to our climate, typhoid fever is the only one in which these hæmorrhages occur. Lastly, a frequent or continual, and often involuntary, discharge of sanious and stercoral matters, is one of the characteristic signs of cancer of the rectum, and sometimes of fistula in ano. Finally, this excretion may be mixed with pus in chronic inflammation and ulceration of the intestines; it is entirely purulent when an abscess, contiguous to the intestinal canal, opens and discharges itself into it.

The matters excreted from the anus may be in a gaseous, liquid, or solid form. The fætidity of the gases becomes increased in intestinal disorder and putrid fevers; their quantity becomes greater in hypochondriacs, who are relieved by its emission: this excretion is sometimes suspended in obstinate constipation; it is painful in inflammation of hæmorrhoidal tumors, dysentery, &c. Excreted matters are, in some diseases, harder than in health, as in cancer of the stomach, and particularly lead colic: in the latter disease they form small black hard balls, resembling the excrement of sheep, and are hence called *ovillés*.* When liquid, they vary in consistence from that of water to that of pulp: in the latter case they are termed *pultaceous*.†

The quantity of excreted matters varies, both in each particular excretion, and relatively to the number of excretions in a given time. At the commencement of dysentery, the quantity of mucus expelled is so small as to resemble the sputa, and hardly to stain the linen with which it comes in contact. In certain cases of diarrhœa following obstinate constipation, and in cancerous contraction of the intestines, a single excretion sometimes furnishes several pounds of fæcal matter. When the discharges are very frequent, as in the dysentery observed by *Zimmerman*, in which some patients went to stool two hundred times in twelve hours, the quantity of matter excreted was very considerable.

The form of the fæcal matters, it is sometimes highly important to ascertain; as in cases of cancer of the rectum previous to ulceration, in which they are elongated, and often flattened into the form of a ribbon, and preserving to a certain extent the size and form of the intestinal contraction.

The excretions are sometimes transparent and colorless, commonly opaque, and of a yellow, brownish or greenish, and sometimes white, black or red color. The yellow color depends upon the quantity of bile they contain. The peculiar color of yellow ochre, which they sometimes present in typhoid fever, is thought by Dr. Bright to indicate the period when ulceration of the intestines takes place. This opinion of the English pathologist has not as yet been verified. Fluid alvine discharges, in which occur a greater or less quantity of thick and whitish clots, resembling a decoction of rice or whey, were characteristic of the Asiatic cholera; it was

* *Ovis*, sheep.

† *Puls*, pulp.

shown by chemical analyses made at Moscow, Warsaw, Berlin, London, and Paris, that a portion of the elements of the blood, the serum and the salts, were then evacuated by the intestine, and that the white flocculi were formed by albumen in the concrete form, which seemed to be in excess in patients affected with his disease.

If the stools be of a deep black color, the presence of blood is indicated; a dark green color depends upon the presence of bile. The excreted matters sometimes resemble chocolate or coffee grounds, which indicates that sanguineous exhalation has taken place in the upper portion of the digestive tube, particularly the stomach; it is owing to blood which has undergone partial digestion.

The peculiar fetidness of the excrements often becomes increased in disease; a cadaverous odor is noticed in adynamic fevers and chronic ulceration of the intestines. They exhale the odor of anatomical maceration in certain cases of malignant dysentery.

The fecal matters may contain foreign bodies, formed within the body, or introduced from without. They often present mucous pellicles or shreds, which appear to be the result of phlogosis of the mucous coat, or of gangrene or ulceration of this membrane; portions of intestine which have become separated by gangrene after intestinal invagination, have been found in them; also tumors, biliary or intestinal calculi, different species of worms, &c.

Foreign bodies from without present the greatest variety: they are sometimes substances incapable of affording nourishment; and sometimes, partially digested alimentary matters. Kernels enveloped in their epidermis,* as dry peas, for example, which have been retained for several months, have been expelled unchanged.

The changes which take place in the nature, consistence, quantity, and color of the excreted matters, do not depend solely upon disease, being also the effect of remedies. The influence of purgatives upon the frequency of the alvine excretions and consistence of the excreted matters, is familiar to every one. Rhubarb imparts to them a yellow and sometimes a reddish color, resembling water, to which a few drops of blood have been added. The preparations of iron give them a black color, probably from the formation of a sulphuret of iron; calomel imparts to them a dark green color. Under these circumstances it is important not to confound the phenomena of the disease with those produced by remedies.

* De Sedib. et Caus. morb. epist. xxxi. art. 27.

SECTION SECOND.

Symptoms furnished by Respiration.

In the healthy condition, the respiration is easy, regular, and without noise; its frequency, that is, the number of inspirations and expirations in a given time, is relative to the age and condition of each individual. The number of respirations is generally about thirty-five per minute in the first year of life, twenty-five in the second, twenty, at puberty, and eighteen in the adult age. It is a little more in females, lively persons and those of small stature, than in those in opposite conditions; this number becomes increased in all persons after physical exercise, declamatory efforts, profound emotions, &c. The dilatation of the chest in infancy takes place principally by the motion of the ribs; in old age, by that of the diaphragm, and, in the adult, by the movements of both combined.

In disease, respiration furnishes numerous symptoms. Having first studied those which belong to the alternate movements of inspiration and expiration, we shall proceed to consider those which are accidental, as coughing, sneezing, &c.

§ I. Respiration, considered in the alternate movements of inspiration and expiration, presents numerous changes in respect, 1, to the frequency of these movements; 2, their quickness; 3, the quantity of air inspired and expired; 4, the difficulty of respiration; 5, its irregularities; 6, the sound accompanying it; 7, the qualities of the air expired; 8, and finally, to these phenomena should be added those furnished by auscultation, succussion, percussion, inspection, and mensuration of the chest.

In order for the physician to appreciate these various changes, the patient should either be seated or upon the back; he should wait till the emotion occasioned by his presence shall have passed away, and even then avoid the appearance of examining this function, since such is the influence of the will, that it ceases to act according to its ordinary rhythm the moment it attracts the attention of the patient. The most simple mode of accomplishing this, is to place the finger upon the *pulse* of the patient, while counting with the watch the number of *respirations* in the minute.

1. Respiration is *frequent*, when the number of inspirations and expirations is greater, in a given time, a minute for example, than in the ordinary condition; it is *rare*, when the number is less. It is only in cerebral affections that rareness of the respiration is observed.* Its frequency, on the contrary, is increased in a great number of diseases, and especially those of the heart and lungs.

* Floyer counted as few as seven respirations in the minute, in more than one case of asthma; and Graves has recorded as few as twelve in some cases of fever. — TRANS.

2. Respiration is *quick* when the movements of inspiration and expiration are performed with rapidity; *slow*, in opposite conditions. Quickness and frequency, slowness and rareness, exist simultaneously in most thoracic diseases. In some cases, however, as in pleurisy, respiration is quick without frequency, or at least its quickness far surpasses its frequency; at other times, it is quick and rare, as in the agony, in which the patient at long intervals makes a rapid but ineffectual effort at inspiration, which is succeeded by an interval of repose.

3. Respiration is *full* when the quantity of air inspired is greater than usual; *small* when less, as in pleurisy and peripneumonia.

The dilatation of the chest, and consequently the quantity of air which penetrates the lungs, is not always equal in the two sides. Pleuritic effusion, or the hepatization of a lung, is a more or less complete obstacle to the entrance of the air into the corresponding side. If the patient's chest be uncovered, it will be seen that, while the movements of one side are in the normal proportion, the other, which is the diseased side, remains immovable, or nearly so. If, instead of examining these phenomena by the eye only, one of the hands be placed on each side of the chest a little below and outside the nipples, these differences become doubly evident, being marked in proportion to the quantity of air which the patient is compelled to inspire into one lung, in order to the performance of the functions of both.

4. *Dyspnœa*,* or difficulty of respiration, presents itself under various forms. Respiration is simply *laborious*, when the respiratory efforts of the patient do not oblige him to remain seated. In many cases, it is not experienced by the patient, except after a hurried walk, or ascending a flight of stairs. If the dyspnœa compel him to retain the sitting posture, it is called *orthopnœa*,† which is particularly observed in the advanced stages of organic affections of the heart, in the paroxysm of suffocation in pulmonary emphysema and nervous asthma, and in double hydrothorax and simultaneous inflammation of the two lungs. When there is at the same time danger of suffocation, it is termed *suffocating*, *panting* dyspnœa; lastly, there is *painful* dyspnœa, in which the thoracic movements are as it were arrested by the pain experienced in executing them, as in pleurisy. *High* respiration is that in which the patient is obliged to remain sitting, as in *orthopnœa*, and to dilate the thorax, by elevating its sides, as in full *respiration*. Difficulty of respiration is sometimes so great, that the contractions of the inspiratory muscles, and particularly those of the diaphragm, are as it were convulsive: the chest and abdomen are alternately raised, the neck is bent backward, the point of the sternum, at each inspiration, is drawn towards the spine, particularly in children, and in some cases all the muscles in the body

* *Δυσπνοια*, from *δυσ*, with difficulty, and *πνεω*, I breathe.

† *Ορθοπνοια*, from *ορθος*, right, and *πνεω*, I breathe.

are in a state of spasm, indicative of the anxiety of the patient and of his inability to produce sufficient dilatation of the chest. Finally, respiration may be completely suspended, constituting *apnœa*.* Difficulty of respiration presents also this remarkable peculiarity, that in some cases, both the inspiration and expiration are equally difficult, and in others, one of these movements, which is always expiration, is performed with a degree of freedom, while the other is very laborious, as is observed in œdema of the glottis.

In some cases of habitual dyspnœa, it is important accurately to ascertain the period at which this phenomenon first made its appearance, as this knowledge may enable us to determine the nature of the organic lesion which produces this derangement: it appears from the researches of M. M. Louis and Jackson, that dyspnœa which has lasted from infancy, particularly when occurring in paroxysms, is an almost pathognomonic sign of pulmonary emphysema.†

5. Respiration is *unequal* when the quantity of air inspired varies in a certain number of successive inspirations; it is *irregular* when the intervals between the alternate movements of respiration are unequal, or do not occur in the usual order; as in *intermittent* respiration, in which the interval between certain expirations and the following inspiration, is sufficiently long for the performance of an entire respiration; also in *interrupted* respiration (*interrupta*), in which inspiration and expiration, but half performed, succeed each other with rapidity, without being separated by an interval of repose; also in *broken* respiration, in which the dilatation of the chest takes place by several inspiratory efforts, and its contraction by as many successive expiratory movements. This respiration resembles that of persons weeping; it has been also observed in hysteria, and often in the rigor which forms the first stages of intermittent fevers.

6. In health, a slight and almost imperceptible murmur accompanies respiration; during sleep, there may be more or less snoring. In disease, the respiration may become *sibilant*, sighing, plaintive, stertorous, or rattling. *Sibilant* respiration is characterized by a peculiar whistling sound, and is sometimes heard both in inspiration and expiration, as in the most severe forms of pulmonary emphysema, and particularly in compression of the trachea by a tumor; in other cases, as in some anginous affections, it only accompanies inspiration. *Sighing* respiration (*suspiriosa*) is that in which, at intervals, after a full inspiration, prompt expiration takes place, accompanied by a peculiar sound, called a sigh. *Plaintive* respiration (*luctuosa*) is characterized by groaning which accompanies each expiration; this has been particularly observed in phlegmasiæ of the chest, and in some grave fevers. A sound like that of a *flute*, or that produced by a brazen tube, sometimes accompanies inspiration. This symptom is not unfrequently noticed

* A primitive, πνεω, I breathe

† Mem. de la Soc. Med. d'Observation, p. 186.

in croup; in some cases, but more rarely, expiration is alone sonorous, the sound in the inspiration being obscure. *Stertorous* respiration, is that accompanied by a loud and vibrating sound; it is observed in severe cases of apoplexy, and in the second stage of the epileptic paroxysm; in *ratling* respiration, this sound is more feeble. *Stertor* differs from snoring in the difficulty of the thoracic movements attending the former, and in the place where it is produced; stertor appears to proceed from the trachea and larynx; snoring from the nasal fossæ or posterior part of the mouth.

7. The changes produced by disease in the expired air, relate to its temperature, odor and chemical composition. The breath is burning in inflammatory fever, cold in adynamic affections and cholera. Its odor is sweetish in certain febrile diseases, acid in some affections of the stomach. In some cases, this acidity is so marked as to impregnate the air of the apartment; this symptom always indicates a grave and generally fatal lesion of the stomach. The breath is fetid and nauseous in bilious fevers and gastric irritation: it is sometimes alliaceous, or resembles the odor of a dead body after maceration, in gangrene of the lungs and certain cases of chronic pleurisy with perforation, sometimes even before the sputa present this character. It is hardly necessary to remark that the odor of expired air does not depend solely upon diseases of the respiratory organs; those of the teeth, mouth, nasal fossæ, and pharynx equally affect it, as in mercurial salivation, scorbutic swelling of the gums, membranous pharyngitis and syphilitic ulceration of the throat, affections in which the breath becomes intolerably fetid.

Chemistry has furnished physiology with valuable results in respect to the changes which the air undergoes in the healthy lungs. It is to be regretted that it has not yet afforded an explanation of the modifications which are incontestably produced in the various affections of the air passages. *Inflammatory induration* of the lungs, the presence of tubercles in this organ, its compression by pleuritic effusion, inflammation of its mucous membrane, together with the *membranous concretions which form upon it* in some cases, are all affections in which the air that penetrates the lungs, undergoes modifications, which it would be interesting fully to appreciate, and which certainly differ from those that take place in health; unhappily, the researches undertaken by Nysten and some others, have as yet thrown little light upon this point in pathology. It was remarked by John Davy and afterwards by M. Rayer, that, in the cold stage of Asiatic cholera, no change, or almost none, was effected in the air, by respiration.*

8. To these phenomena, which have for a long time attracted the attention of physicians, may be added those discovered by Laennec, and which are only perceptible by means of an acoustic cylinder, called a stethoscope,† or by the immediate application of

* *Gaz. Medical*, 1832.

† From *στήθος*, chest, and *σκοπεω*, I examine.

the ear to the chest. This method of exploration constitutes in the first case mediate, and in the second, immediate, auscultation, of which Laennec may be said to be the inventor ; for if it be true that the application of the ear to the parietes of the chest, and the appreciation of the sounds there produced, be twice mentioned in the works of Hippocrates, it is no less certain that these two passages, justly forgotten from their insignificance and obscurity, did not lead to the discovery of a method of exploration, which, in a few years, Laennec so far perfected, that time has neither added to, nor detracted from, the results of his observation.*

If the ear be applied directly, or armed with the stethoscope, to the chest of a healthy person, during inspiration, a very soft sound, or murmur, is heard, produced by the entrance of air into the cells of the lungs. This sound is not equally distinct in all parts of the chest, being most apparent where the walls of the chest are thinnest, as in the hollow of the armpits, below the clavicles, and below and within the scapulæ. It is much louder in children than in adults. In the latter, it varies in intensity, independently of any lesion of the lungs; in some persons it is only perceptible during rapid inspiration; in others it preserves the characteristics of puerile respiration through life. If auscultation be practised during expiration, no sound, in some cases, can be distinguished; in others, a slight murmur is perceptible, but less distinct and of shorter continuance than that heard in inspiration.

In disease, the natural murmur heard during inspiration, may be diminished, cease, be increased or replaced by other and very different sounds, in a greater or less portion of the chest.

The respiratory murmur becomes less distinct, at the commencement of those diseases of the chest, which at a later period cause complete suspension of the respiratory sound in the portion of lung affected. This suspension occurs in the second and third stage of pneumonia, in emphysema, cancerous and tubercular degeneration, cysts and other accidental productions developed in the pulmonary tissue, effusions of serum, pus, blood or air into the cavities. The vesicular murmur may become less distinct, or entirely suspended, throughout a greater or less portion of the lungs, when there is compression of the principal bronchus, by a tumor in the thorax. This is sometimes observed in cases of aneurism of the aorta, and this symptom may indicate the direction in which the tumor is developed. In some of these diseases, the ear can distinguish no natural respiratory murmur or sound whatever; this is the case in great pleuritic effusion; in most other diseases, the respiratory murmur is replaced by morbid sounds, to which we shall allude hereafter.

The absence of the respiratory sound in a portion of the chest, may be fixed and permanent in the hepatization of pneumonia;

* *De l'Auscultation Mediate, ou Traité du diagnostic des Maladies des poumons et du Cœur, fondé principalement sur ce nouveau moyen d'exploration, par R. T. H. LAENNEC.*

Laennec observed in some cases of pulmonary catarrh, a transient suspension of this murmur in a limited portion of the lungs, a phenomenon which he attributed to the momentary occlusion of some of the bronchial tubes by the mucus secreted by the parts; according to him, this absence of the respiratory sound may cease and reappear alternately, either in the same part or in any other. We have never verified this phenomenon, and as the disease alluded to by *Laennec* is a very frequent one, we cannot divest ourselves of some doubts as to its production.

The respiratory murmur sometimes becomes more intense; thus it may acquire, in the adult, the force and tone which it presents in children after forced exercise, in certain neuroses, and particularly when the other lung has become wholly or partially unfit for respiration. In the latter case, the respiratory murmur may be increased, not only in the healthy lung, but also in the healthy parts of the diseased lung.

In some cases, the vesicular sound does not present its natural softness and smoothness, but becomes rude to the ear. Rudeness of the respiratory murmur, as it occurs in inspiration and expiration, is but the first degree of bronchial inspiration, and is observed in those affections in which the latter phenomenon becomes afterward apparent.

This roughness of the respiratory sound is, in some cases, perceptible in the expiration before becoming so in inspiration; the expiration is often at the same time prolonged. Dr. Jackson, of Boston, was the first to call the attention of physicians to this subject, and pointed out this phenomenon, when existing at the summit of the lungs, as indicative of incipient tubercles. M. Andral, in his notes to *Laennec's* book, and, more recently, M. Fournet, have more thoroughly investigated those diseases of the lungs, in which the expiration becomes modified either in force or duration. These phenomena are important in the diagnosis of certain thoracic diseases, at that period of their development when the characteristic signs are absent.

In certain conditions, the soft murmur of respiration is replaced by a louder and rougher sound, called bronchial or tracheal respiration. This is supposed to be produced in the principal bronchial divisions, by resonance of the air, which penetrates but partially or not at all, into the ultimate ramifications or their terminating vesicles.

This sound or *souffle* is particularly audible, if the ear be applied over an indurated portion of the lungs or a moderate pleuritic effusion. It often proceeds from a dilated bronchus, or from excavations produced by ulceration of the pulmonary tissue; in the latter case it is called *cavernous* respiration.

This last variety of sound is generally more superficial and circumscribed than ordinary bronchial respiration. It is particularly observed beneath the clavicles, in the supra and infra spinous fossæ and in the axillæ. It is sometimes intermittent, the cavity being occasionally filled with liquid, or the bronchial tube, communicating with it, being obstructed by mucus.

Under the name *veiled souffle* [*souffle voilé*], Laennec has described a variety of blowing respiration, which is heard in a pulmonary cavity, in which it seems as if each vibration of the voice, cough or respiration, agitates a sort of movable veil interposed between the cavity and the ear of the observer. Laennec pointed out this phenomenon as occurring in those tubercular cavities, whose walls are thin and not adherent to the chest, abscesses of the lungs while surrounded with an inflammatory induration, and some cases of dilated bronchi; this phenomenon, according to him, is very common in pneumonia, when the tissue surrounding the bronchus from which the sound proceeds, remains healthy or has suffered but slight engorgement. But the veiled souffle of Laennec is not so frequent as has been supposed, nor has it the semeiological value which has been attached to it. It may easily be confounded with the other degrees of bronchial sound.

The last variety of souffle is that called by Laennec the *amphoric sound*, from its resemblance to that produced by blowing into an empty vessel with a narrow neck, as a decanter or bottle. This phenomenon is produced when the inspired air penetrates into a vast hollow cavity in the parenchyma of the lungs, and particularly when it passes into the cavity of the pleura, through an ulcerated lung.

The different modifications of the respiratory murmur, just indicated, become increased and diminished with the material lesion on which they depend, furnishing the physician with valuable signs, by which he is enabled to distinguish a diminution or increase in the local disorder, when all the other signs, not excepting those afforded by percussion, might be insufficient; the return of the respiratory murmur, in pneumonia and pleurisy, for example, sometimes indicates the approaching recovery of the patient, several days before the disappearance of the flat sound given by percussion.

Auscultation of the chest, besides furnishing the physician with the means of appreciating the changes in the intensity of the respiratory murmur, also enables him to distinguish the different sounds ordinarily produced by the passage of air through the various liquids which may be contained in the bronchi. These various sounds have by Laennec been designated by the term *râle* or *rhonchus*, which he distinguished into the *crepitant*, *subcrepitant*, *mucous*, *dry*, *sonorous* and *sibilant*.

The *crepitant* rhonchus or crepitation, is a slight sound heard on auscultation, and which has been compared to the *crepitation* of salt when thrown upon hot iron. It is almost exclusively heard in inspiration, and does not always entirely mask the respiratory murmur, which becomes less distinct at this point. The rhonchus which presents the above characteristics only occurs in the first stage of pneumonia, and is consequently one of the most important signs of this disease.* It is of equal value, when, instead of

* This rhonchus is also heard in certain forms of pulmonary congestion, in œdema, apoplexy of the lungs, and, according to Stokes, in incipient phthisis. It

being formed by numerous and distinct bubbles, it conveys to the ear a dry, continuous sound, resembling that produced by rubbing silk, or tearing a piece of taffeta. The latter is the most accurate comparison, and the sound is often designated by the term, *bruit de taffetas*.

There is another crepitant rhonchus heard in the commencing resolution of pneumonia, when the lungs are passing from the state of red hepatization (second degree) to simple engorgement (first degree). This has been called by Laennec the *crepitant rhonchus of return* or *subcrepitant*, being a variety of the dry crepitant, rhonchus. It is formed by bubbles, which are numerous, less regular, larger and more moist, being more distinct during inspiration than expiration. It belongs also to capillary bronchitis, being particularly evident at the base of the lungs. Some authors have regarded this rhonchus as belonging also to pulmonary emphysema; but according to M. Louis, it only exists in this disease when complicated with pulmonary catarrh, and in this case, results from the bronchitis, and not from the dilatation of the vesicles. When this rhonchus is continuous, confined to one of the scapulæ fossæ or to some point just beneath the clavicles, and does not succeed pneumonia, it indicates the presence of tubercles in their softening stage. The subcrepitant rhonchus which depends upon this grave lesion, ordinarily consists of bubbles which are larger and fewer than in the subcrepitant rhonchus of simple catarrh; they are also somewhat ruder in sound, being generally designated by the term *moist or dry crackling*, according to the sensation produced upon the ear. This constitutes the first degree of a phenomenon which will be hereafter considered, called *gurgling* (*gargouillement*).

The *mucous* rhonchus consists of still larger bubbles, which are more moist and ordinarily more unequal than the preceding; it is produced by the passage of the air through fluids contained in the trachea or bronchi, or accumulated in the ulcerated cavities which succeed tubercular softening. This sound is similar to that heard in the throats of dying persons. It sometimes exists over a large extent of the chest in those affected with pulmonary catarrh, and is always confined to one or more circumscribed spots in phthisis. It often disappears after coughing, from the displacement of the mucus by which it is produced.

In some diseases, if the ear be applied over some point of the chest, a sound is distinguished analogous to that produced by the agitation of a liquid mixed with air bubbles. This phenomenon, which in its lightest form may be easily confounded with the mucous and subcrepitant rhonchi, but which is easily distinguishable from these when strongly marked, has been termed *gurgling* or the *cavernous* rhonchus. It is chiefly heard at the summit of the lungs, and is a certain sign of cavities arising from tubercular

is a curious fact, mentioned by Hourmann and Dechambre, that in old persons the bubbles which produce this rhonchus are larger, owing to the increased size of the pulmonary cell, caused by the absorption of the intercellular tissue.

—TRANS.

softening. It may also exist, though more rarely, in dilatation of the bronchi and in the cavities produced by circumscribed gangrene or pulmonary abscess, but generally in such cases so differing in situation and extent, as not to lead to error in the diagnosis. In order to the production of this sound, the cavity should not only be entirely filled with liquid, but in extensive communication with the bronchi. It is chiefly audible when the patient coughs, or draws a full and deep inspiration.

Gurgling is, in most persons, heard over a circumscribed and limited space, one or two inches in size, for example. In cases where it is perceptible over a greater extent, it commonly varies in intensity and form, at different points, and the cause of this is easily explained; this phenomenon being almost always produced by the agitation of air with a liquid in ulcerated cavities following tubercular softening, and these cavities being often numerous and varying in their size and form, in the quantity and consistence of the fluids which they contain, and the different conditions of the opening by which they communicate with the bronchial tubes, the sounds resulting from this agitation must vary at different points within a short distance of each other.

There are, however, some cases in which a manifest gurgling is distinctly audible, *over the whole of one side of the chest*, together with a dull sound on percussion, the gurgling being *everywhere the same as to its intensity and form*. The diagnosis, in the first case of this kind that I observed, was so obscure, that I hesitated in giving an opinion. The patient had, at first, presented all the signs of a *considerable pleuritic effusion*; dull sound, absence of respiratory murmur and vocal resonance, together with dilatation of the diseased side. When I saw him, a month afterwards, the dull sound still continued; but to the ear, applied successively in front, behind, above and below, a gurgling sound was everywhere distinguishable, the same in form and degree, as if the pulmonary tissue had been entirely transformed into a multitude of ulcerated cavities, all presenting similar phenomena, and consequently material conditions exactly identical, a circumstance which, without being strictly impossible, was entirely inadmissible. This young man after leaving Paris died in the provinces; no examination after death was made.

I again observed this gurgling, uniform in rhythm and intensity, together with a dull sound on percussion, over the whole of one side of the chest, in a patient at La Charité. This man rejected by the mouth, a few days after his entrance into the ward St. Jean de Dieu, more than a pound of fetid pus, which must have come from the cavity of the pleura. This second case afforded me the explanation of the former, and led me to suppose that an excavation formed in the pulmonary tissue, opening into the bronchial cavity, and situated just beneath the pleura, the cavity of which is filled with pus, may, under some conditions not yet with certainty determined, if a thin pellicle alone intervenes between the ulcerated cavity of the lungs and the pus contained in the pleura,

or if there exist a valvular opening preventing the passage of air into the pleura and the production of pneumothorax, give rise to a phenomenon as remarkable as that observed in the two cases just alluded to. The gurgling was probably produced, as it ordinarily is, in the tubercular cavity, and thence transmitted to the whole periphery of the chest by the liquid contained in the pleura, as, under other circumstances, this liquid transmits the voice (egophony), and the respiratory murmur bronchial respiration.*

The patient last alluded to, after having vomited pus in abundance, and at various times, gradually recovered so as to be able to leave the hospital. I advised him, should the symptoms again present themselves, to return. He, however, finally recovered, at least to all appearance. This case, though incomplete, fixed my opinion upon the value of this symptom, which I believe has not before been pointed out.

A third case, more recently observed at Hotel Dieu, gave farther evidence of the value of this sign. A negro who was admitted into the ward Sainte Madeleine, presented symptoms of pleuritic effusion, with intense fever: to these phenomena, was soon added a gurgling similar to that which occurred in the two other cases, being audible over the whole of one side of the chest, and everywhere under the same form and with equal intensity. A few days after, a large quantity of pus was rejected by the mouth. After the death of the patient, we were able to ascertain with certainty, that the cavity of the pleura being filled with pus, communicated with the bronchi by means of a tubercular cavity. The insufflation of air into the trachea showed the point at which the pleura was perforated, and permitted us to trace the fistulous track to one of the bronchial divisions.

In these three cases only, have I observed this form of gurgling with the conditions described, and in all these the disease commenced in the same manner, by a pleuritic effusion.

I have twice observed a form of gurgling somewhat analogous to that in the preceding cases, from which it should be distinguished.

A patient was admitted to the Hotel Dieu for a chronic affection of the chest, who presented, independently of the cough, opaque sputa, dyspnœa, and the other ordinary phenomena of hectic fever, a dull sound over the *whole anterior part* of the *left* side of the chest. At whatever point of this portion the ear was applied, gurgling was audible; this gurgling, as in the three other cases, was everywhere the same as to form, but its intensity, instead of

* The co-existence of a pleuritic effusion with tubercular cavities in the lungs is by no means rare, although the kind of gurgling which I have pointed out has only been observed in a very few cases; it is necessary then, in order to the production of this phenomenon, not only that this complication exist, but that it should exist under peculiar conditions, without which it could not take place. This phenomenon appears to me a certain sign of the simultaneous existence of the two lesions just indicated; but its absence by no means proves the non-existence of this complication.

being the same wherever the dull sound existed, progressively diminished from the summit of the thorax where it was very manifest, to a point below the heart where it became obscured. I was led to suspect in this patient a lesion analogous to those which existed in the three others, but confined to the anterior part of the chest, in short, a partial effusion into the pleura with perforation of the pulmonary parenchyma about to take place, or already completed. The exceeding rareness, however, of pleurisies confined to this region, and the progressive diminution in the gurgling sound from the summit towards the base, caused me to be circumspect in the diagnosis. After death, we found at the summit of the left lung, a collection of small tubercular cavities, in an extent, of the size of a pullet's egg, the rest of the anterior portion of the pulmonary parenchyma being indurated and presenting a grayish appearance. In this case the gurgling had evidently been produced in the ulcerated cavities at the summit of the lung, and the sound had been transmitted by the indurated lung, and in the whole extent of the induration, with the progressive diminution in intensity, above mentioned. I had occasion to observe in another case, under analogous anatomical conditions, the same phenomenon, but less marked and heard over a less extent.

It follows from these cases that a similar sound, heard over a great extent, or over the whole of one side of the chest, should lead us to suspect two distinct lesions, the one which gives rise to the production, the other to the transmission, of the gurgling. The first, generally consists of one or more ulcerated cavities in the pulmonary parenchyma, the second, in induration of the lung, or pleuritic effusion. If the gurgling be perceptible over the whole of one side of the chest, with the same form and intensity, its transmission depends upon a pleuritic effusion; it is owing to pulmonary induration, if the sound, the same as to its form, progressively diminishes in intensity over the extent in which it is heard. In the latter case, the transmission is almost always confined to a part of the chest; in the former, it ordinarily extends over its whole side.

The *sonorous* rhonchus is a dull sound, sometimes extremely loud, which at one time resembles the snoring of a person asleep, at another, the base note of a violoncello, and occasionally the cooing of a pigeon. This phenomenon must not be confounded with the guttural sound produced by some persons when asleep, and which any one may imitate at will. The latter is produced in the throat; that which we are now considering, proceeds from the chest, and is only perceptible by auscultation. It seems to depend upon a change in the thickness and humidity of the bronchial mucous membrane.

The *sibilant* rhonchus commonly resembles a prolonged whistle, low or acute; sometimes, the chirping of small birds, the sound of a pump, or the clacking of a valve. It appears to be owing to a small quantity of very viscid mucus which partially fills up the bronchial ramifications, or to swelling of the mucous membrane. These two varieties of the dry rhonchus, but particularly the

latter, occur in acute or chronic pulmonary catarrh, and at every period of the disease. These rhonchi, both the sibilant and sonorous, are heard over almost the whole extent of the chest in patients with typhoid fever; they are louder, and audible over a greater extent, than in bronchitis, although there is less dyspnœa than in the latter affection.

Independently of the sound perceptible to the ear in the various kinds of rhonchus, there sometimes exists, particularly with the sonorous rhonchus, a sort of trembling, perceptible to the hand, in that portion of the chest corresponding to the part affected. When the lesion which produces the rhonchus is deeply seated, this trembling is not so distinct; the absence of this phenomenon becomes then a sign which may aid in determining the particular seat of the disease.

There is another variety of sound, differing from the rhonchus, which may be distinguished by auscultation during the respiratory movements, and still more easily if the patient speaks or coughs. This sound, called by Laennec *metallic tinkling*, resembles that emitted by a plate of glass or metal when gently struck with a hard body. This phenomenon has only been observed in patients with ulcerated cavities in the lungs or pleuritic effusion. In both cases, it appears indispensable to its production, that the cavity contain a liquid together with air, and that it communicate with the bronchi. According to Laennec, this sound is produced by the resonance of air agitated at the surface of the liquid, or the falling of a drop of fluid from the summit of the cavity into the fluid collected in the under part of it. Other physicians (M. M. Dance and Beau) have endeavored to explain this phenomenon by supposing that in the act of speaking, coughing or breathing, air escapes through the pulmonary fistula into the liquid effusion, and rises to its surface in the form of bubbles of a greater or less size, which, in breaking, cause a vibration in the air above, thus producing the resonance which constitutes metallic tinkling.*

* However satisfactory the explanations which have hitherto been offered to account for this curious phenomenon, none has as yet been found to hold good in all cases.

We have been kindly permitted to quote two cases which fell under the observation of Dr. J. D. Fisher of this city, as proving the truth of this assertion, and illustrative of the ingenious theory proposed by him, in accounting for the production of this sound.

The first was a case of pneumothorax, in which the metallic tinkling was heard in its maximum intensity over the right scapula, and at the acme of each respiration. Upon examination, a communication was found to exist between the bronchi and cavity of the pleura by means of a small opening, almost exactly opposite the point where, during life, the sound was most distinct, and far above the level of the fluid which was in small quantity and of the consistence of thick cream. Upon examining this opening, it was found to be covered by a small semi-circular flap, apparently formed by a thin lamina of the pleura, about three lines in diameter, and which, upon blowing into the trachea, was forced open, a slight *click* being at the same time audible.

The second case was that of a large cavity in the lungs, with exceedingly thin walls, and in which the sound was also heard at the acme of respiration. This

Metallic tinkling is not always the same. Thus, when it takes place in a cavity, it is only audible over a circumscribed space, while, if symptomatic of pulmonary fistula and pneumothorax, it is heard over a great extent. Laennec remarks that this phenomena is more appreciable, when the fistula is large and the quantity of air in the chest very considerable.

The metallic tinkling generally coincides or alternates with amphoric respiration. Great respiratory efforts render them more manifest, and may reproduce them when not permanent.

There is still another phenomenon which we shall point out, not without importance as a diagnostic and prognostic sign; we refer to *thoracic succussion*, a method of exploration employed by Hippocrates, and clearly pointed out in his works, but the semeiological value of which he did not fully appreciate. This method consists in forcibly shaking the patient's chest, while the ear is placed near this cavity: the sound of fluctuation is then distinctly heard, sometimes extending to the assistants at a distance, and the patients

sound was produced after the death of the patient, by blowing through the trachea. In this case, as in the other, the cavity was found to contain but little fluid, and the bronchial opening, which was of considerable size, existed *above* its level, its truncated portion being remarkably smooth. This opening was only discoverable by blowing into the trachea, when, as the air passed into the cavity, the walls, which were previously in close contact, and, as it were, glued together by the viscid secretion of the part, were seen suddenly to separate with a sound almost precisely similar to that produced during life.

It would appear then that, at least, in these two cases, the principal condition necessary to the production of the metallic tinkling, according to the theory of Dance and Beau, and the experiments of Fournet, Bigelow and others, viz. the existence of an opening below the surface of the fluid, was absent. The theory of Laennec would also seem, in these cases, insufficient to explain this phenomenon, as the sound occurred at regular intervals with each respiration, the patient being in a state of rest.

In order to the farther elucidation of this point, Dr. Fisher made the following experiment, which seems fully to confirm the views which he had previously entertained.

Having inserted an elastic flexible tube into the neck of a distended bladder, upon blowing into it, the amphoric resonance was distinctly heard. He now poured a thick solution of gum arabic into the tube, to render the conditions, as nearly as possible, similar to those in the above mentioned cases, when upon again blowing into it, a click exactly resembling the metallic tinkling was distinctly heard.

He concluded, from these observations and experiments, that if an *unobstructed* opening into a large cavity, exist, amphoric resonance will be produced, while if there be, in this opening, any impediment to the passage of the air, as viscid mucus, or, as in the first case, a valvular formation, which suddenly yields, the metallic tinkling is the result.

The following, then, are the conditions which, according to Dr. Fisher, are necessary to the production of this sound; 1, a cavity of considerable size with thin walls; 2, a communication between this cavity and the bronchia, by an opening in which there exists some obstruction which suddenly yields to the force of the air.

Without denying the possibility of the occurrence of this sound under the conditions hitherto considered necessary to its production, it must be admitted that there are cases in which these conditions entirely fail, and in which some other explanation must be sought. The theory proposed by Dr. Fisher affords a satisfactory explanation of this sound in cases which are inexplicable by any other, and may be found to account for its production in nearly all cases. — TRANS.

themselves often perceiving it when executing any movement, as descending a staircase, examples of which are related by Ambrose Paré, Willis, Morgagni, Boyer, &c.* This sound, regarded by Hippocrates as a sign of serous effusion in the chest, is never heard in simple hydrothorax; it only occurs in cases in which the pleura contains liquid and air together, and is sometimes produced when an enormous hollow cavity in the lungs exists. As we have seen, metallic tinkling, amphoric respiration and the hippocratic fluctuation, are phenomena equally characteristic of a determinate alteration; wherever any one of these exist, the prognosis must be grave, since it reveals the existence of pathological conditions almost necessarily fatal.

Thoracic fluctuation should not be confounded with an analogous sound sometimes produced in the stomach when the body is shaken, the stomachal gurgling which has been before alluded to: it is sufficient to be warned of this error in order to guard against it.

Independently of these sounds that we have just considered, and all of which are owing to the passage of air into the natural or accidental cavities, there is another which depends upon the friction of serous surfaces against each other. This sound has been described by Laennec, under the term, ascending and descending murmur (*murmur ascensionis et descensionis*).

But Dr. Reynaud was the first who thoroughly investigated the anatomical conditions which give rise to this sound and ascertained its true value as a diagnostic sign. In the ordinary act of respiration, during the alternate movements of elevation and depression of the thoracic parietes, there is a rubbing of the pulmonary against the costal pleura; but owing to the smoothness and moisture of these surfaces, no sound is probably produced, or if it exist, it is confounded with the natural murmur of respiration. But when more or less roughness or inequality exists, produced by false membranes adherent to the surface of the pleuræ, a rough friction sound, like that of rumpled parchment, a file, or new leather, accompanying both respiratory movements, but particularly that of inspiration, is audible at a point corresponding to this lesion. In some cases, by applying the hand over this part, a peculiar and characteristic tremor is perceived. The friction sound may occur at the commencement of dry pleurisy, or towards the termination of pleurisy with effusion, when, in consequence of the reabsorption of the fluid, the two opposite surfaces of the pleura, covered with false membranes, come in contact. Laennec was probably wrong in attributing the ascending and descending friction sounds to interlobular emphysema of the lungs.

Besides these phenomena furnished by means of thoracic auscultation, there are others occurring in rare diseases, that have not yet been observed since this mode of exploration became known, which it cannot fail to reveal.

* Laennec, tom. ii. p. 587; 4^e edition.

In hernia of the lungs through the intercostal muscles, for example, the application of the stethoscope over the tumor would undoubtedly enable us to hear the entrance and egress of the air, thereby adding a new sign to the diagnosis of this affection. In cases in which borborygmi are audible above the region of the stomach, the existence of hernia of the stomach or intestines through the diaphragm, might, according to Laennec, be safely inferred. This certainty, however, cannot exist until an assertion, which is probable, but the truth of which is not yet demonstrated, shall have been confirmed by experience. The varieties presented in the concavity of the diaphragm, and those which exist, consequently, in the position of the stomach, the facility with which sounds are transmitted to a certain distance, the peculiar noise produced by the rising of the air from the stomach into the œsophagus, appear to us to justify the doubts that we have entertained in respect to the pathognomonic value of this phenomenon.

Auscultation of the voice furnishes the diagnosis of thoracic diseases with certain phenomena interesting to the observer, and very useful in a diagnostic point of view. When a healthy man speaks or sings, his voice generally produces over the whole extent of the thoracic parietes a kind of vibration perceptible to the hand. If the ear, or stethoscope, be applied to the chest, this vibration is less apparent; but a remarkable resonance is observed, particularly in those regions where the soft parts are thinnest, or those corresponding to the larger bronchi more or less superficially situated. Thus, this vocal resonance is particularly apparent in the axillæ, in the superior and anterior regions of the chest, in the interscapular space, and at the superior and internal angles of the scapulæ, particularly the right, the lung of that side being more voluminous and the bronchus larger. This natural resonance of the voice is wanting in some persons; in others, it is hardly perceptible; it is particularly observed in those who have a deep, sonorous voice, and full chest. In disease, this resonance undergoes important modifications; it may be diminished, completely cease, or be replaced by other phenomena, known as bronchophony, ægophony and pectoriloquy.

The natural vibration of the thoracic walls is generally diminished in hepatization of the lungs; it entirely ceases in cases of pleuritic effusion, so that it is sometimes possible to mark exactly the level of the liquid by the point where the resonance begins to be again perceptible; but this phenomenon is of far less importance than those we are about to consider.

*Bronchophony** is a resonance of the voice more or less loud and diffused, an accurate idea of which may be obtained by applying the stethoscope over the larynx of a person while speaking. In disease, this phenomenon is produced under the same anatomical

* *Βρογχος*, bronchus; *φωνη*, voice. In accordance with Greek etymology it should be written *broncophony*; but we have thought that the word created by Laennec, and accepted by science should be preserved; besides, the terms *bronchi*, *bronchial*, are employed.

conditions which give rise to tubal or bronchial respiration, that is, in red and gray hepatization of the lungs, pleuritic effusions, and pulmonary induration produced by tubercular matter, melanosis, &c. When bronchophony and tubal respiration depend upon disease of the parenchyma of the lungs, these sounds remain the same in whatever position the patient be placed. If, on the contrary, they are owing to effusion, by placing the patient in different positions, these phenomena are rendered more marked, or more obscure, and the point where they are produced, if nothing oppose the falling of the fluid in obedience to the laws of gravity, may become changed. Now, observation shows that this is far from common, and that in most cases, in which the effusion has existed but a few days, the liquid remains within the same limits, whatever be the attitude of the patient. In regard to the theory of bronchophony, Laennec thought that it resulted from impermeability of the air cells and ultimate bronchial ramifications, and the consequent resonance of the voice in the large bronchial tubes. The explanation of this, as of other phenomena, is a secondary consideration. The phenomenon itself and its semeiological value are important points, which happily are understood.

Ægophony,* like bronchophony, consists in increased resonance of the voice, but presenting different characteristics. This resonance is sharp, trembling, or broken, like that of a goat, and seems more like the echo of the patient's voice, than the voice itself. If this phenomenon occur in a part adjacent to a large bronchial trunk, towards the root of the lung for example, in addition to a remarkable resonance, and under the influence of these two conditions united, the voice presents modifications, resembling that produced by a counter placed between the teeth and lips of a person while speaking, or *bredouillement** which constitutes the language of Punchinello. *Ægophony* may be perceptible in nearly all parts of the chest; but it is heard particularly between the spine and scapulæ, around the latter bones, and in a zone two or three inches wide, extending between the scapula and nipple. It is sometimes distinguishable on the first day; it however becomes more marked in the few days following, and afterwards disappears, the effusion being either absorbed or increased. This phenomenon, may, like bronchophony, become obscure, disappear, or change its place according to the position of the patient, if adhesions do not prevent displacement of the fluid.

Laennec ingeniously explained the phenomenon of *ægophony*, by supposing it to be produced by the vibration of the voice, transmitted through a thin and trembling layer of fluid. The same author also remarked that a pleuritic effusion by compressing the bronchial tubes, flattens them like the mouthpiece of a

* *Αἴξ*, *αἴγος*, goat; *φωνή*, voice.

† A precipitate and indistinct mode of utterance, in which a part of the words only is pronounced, and several of the syllables viciously changed. It is analogous to stuttering in some respects. — Tr.

bassoon or hautboy, instruments which produce a bleating sound. The false membranes which sometimes cover the surface of the pleura, have also been supposed to give rise to the same phenomenon.

Whatever be its explanation, we cannot grant to this phenomena all the importance attributed to it by Laennec, and consider it as a pathognomonic sign of pleuritic effusion; for, on the one hand, there are many healthy persons in whom ægophony exists, as Laennec himself admits; and on the other, it has been noticed in cases of hepatization of the lungs, as has bronchophony in some cases of pleuritic effusion. If, however, ægophony be not pathognomic of effusion, it should certainly lead us to suspect its existence. It is sometimes difficult to distinguish between ægophony and bronchophony; they often exist together, a circumstance which has led to the term broncho-ægophony.

Pectoriloquy * consists in a peculiar resonance of the voice, which, in mediate auscultation, seems to issue directly from the chest of the patient, and pass through the central canal of the stethoscope; if the physician employ immediate auscultation, it appears as if the patient were speaking in his ear.

Laennec distinguishes several varieties of pectoriloquy, which he severally terms *perfect*, *imperfect*, and *doubtful*. The first is alone of any real value. The two others, rather resemble bronchophony, or the ordinary resonance of the voice. They may be distinguishable, in the healthy state, in certain parts of the chest, particularly at the summit, and as far as nearly to the third rib. But that circumscribed and distinct resonance of the voice, which constitutes pectoriloquy, should be considered as pathognomonic of a hollow cavity in the lungs, whether it be owing to a simple dilatation of a bronchus, partial suppuration of the lungs, or, as generally happens, to tubercular softening.

In order to the occurrence of pectoriloquy, the existence of a well defined superficial hollow cavity in the lungs, of medium size, that of a nut or small pullet's egg, for example, with hardened walls, is necessary; the cavity should be empty and communicate freely with the bronchi; there must be absence of aphonia, which is a frequent symptom in the last stage of phthisis, as if this exist, pectoriloquy cannot be produced. The phenomenon fails, or is less perfect, if the cavity be filled with a liquid, be too large or irregular in its shape, and communicate with the bronchi by means of small openings alone, which are not in proportion to the size of the cavity. In general, pectoriloquy is more apparent when the voice is sharp, than when low or hoarse. This phenomenon disappears and returns alternately in some persons: this intermittence is generally owing to the transient occlusion of the cavities or of the bronchial tube which communicate with it. Gurgling often accompanies pectoriloquy, and adds to its value as a sign.

* From *pectus*, breast; *loqui*, to speak,

Percussion, as well as auscultation of the chest, furnishes many important signs, which we shall now proceed successively to consider.

In disease, the sound of the chest, on percussion, may be clearer than natural, more dull, or entirely flat. The sound becomes clearer whenever the quantity of air in the chest becomes increased, and the nearer this fluid is to the point percussed; this is the case in pneumothorax and pulmonary emphysema. In the first of these affections the chest sounds like a drum over a greater or less portion of its extent; in emphysema the sound is less clear in pneumothorax, but clearer than in the healthy state. In both affections, the clear sound may be confined to a limited space, or it may extend over the whole of one side in pneumothorax, and over both in emphysema. In one of these diseases the excess of resonance is owing to the presence of air in the pleura; in the other, to its accumulation in the dilated pulmonary vesicles. A sound clearer than natural may also be elicited, when percussion is practised over a large empty cavity superficially situated. If the cavity be partially filled with a fluid, and the thoracic walls be thin and elastic, the sound on percussion is that called by Laennec *le bruit de pot fêlé*, the *sound of the cracked pot*, in which the resonance of a cavity with gurgling is distinguished. This has as yet never been observed except in phthisical patients, just beneath one of the clavicles.

The sound of the chest becomes obscure or dull, whenever the lung is indurated, or when a solid or liquid body interposes between this viscus and the thoracic parietes at the point percussed. The sound of the chest is slightly diminished in pulmonary congestion, the first stage of pneumonia, and some cases of tubercles before becoming united into a compact mass, and in slight effusions of liquid. It is completely flat (*tanquam percussi femoris*) in all cases of pulmonary induration, in rare cases of tumors within the chest, and finally, in liquid effusions so abundant as to press the lungs backward towards the vertebral column. In the latter case, by varying the position of the patient, it might be possible to alter the results of percussion, if the effusion were partial, and there were nothing to prevent the fluid from obeying the laws of gravity. Nothing of this kind is observed when the dull sound is owing to pulmonary induration, or the presence of a tumor.

In enumerating the causes which produce a dull or obscure sound of the chest on percussion, we have not referred to the adhesions of the costal with the pulmonary pleura, as, in our opinion, they have no part in producing this effect. To be convinced of this, it will be sufficient to recall those cases of phthisis, in which the chest sounds clear over almost its whole extent, although the adhesions are stronger, and a more constant symptom in this than in any other disease. Adhesions do not affect the resonance of the chest, unless there be serous or gelatinous infiltration into the cellular network of which they are composed.

Whenever the sound elicited by percussion is flat or even

obscure, that peculiar elasticity which is always felt in percussing a healthy chest, is no longer perceptible. There is, on the contrary, a feeling of hardness or resistance, which is in proportion to the density of the body producing the dullness.

The rules relating to the employment of auscultation and percussion, together with the semeiological value of the phenomena furnished by these two important methods of exploration, will be considered in the chapter on diagnosis.

§ II. *Respiratory phenomena.* Having now presented the principal symptoms furnished by the respiration itself, we shall proceed briefly to consider some of the respiratory phenomena, as laughing, yawning, sneezing, hiccough, coughing, exspuition, and expectoration.

1. Laughing (*risus*) consists in an interrupted expiration, accompanied with a cheerful expression of the features, and particularly retraction of the lips. This is a phenomenon peculiar to health, rather than a symptom of disease. There are, however, many affections in which it occurs under the latter form, depending either upon the state of the mind, as in the delirium of acute diseases and certain forms of mental alienation, or upon a special derangement of the nervous system, as in hysteria, and, as some have asserted, in wounds and inflammation of the diaphragm.

2. In yawning (*oscitatio*) there is suddenly a deep, slow, and sonorous inspiration, with separation of the jaws, and accompanied with flexion, followed by the slow and gradual extension of the limbs, and particularly the arms. This latter movement, called *pandiculation* (*pandiculatio*) sometimes occurs without the yawning, which it almost always accompanies. Both these symptoms frequently appear at the commencement of the paroxysms in intermittent fever, and towards the close of an hysterical attack.

3. Sneezing (*sternutatio*) consists in a violent and convulsive expiration, by which the air is driven rapidly, and rushes sonorously, through the nasal fossæ, carrying with it the mucus adhering to these parts. Sneezing, although, like yawning and stretching, occurring in health, is a frequent symptom in coryza, and in the first period of rubeola.

4. Hiccough (*singultus*) is the result of a sudden and involuntary contraction of the diaphragm, accompanied with contraction of the glottis which prevents the entrance of air into the trachea. This symptom occurs under various circumstances, as in the lightest affections, and even in persons in perfect health, and in very grave diseases, as, abdominal inflammation, and particularly peritonitis, strangulated hernia, and all cases of stoppage in the course of fæcal matters, in which its appearance confirms the diagnosis, and renders the prognosis more unfavorable.

5. The cough, (*tussis*) according to physiologists, consists in violent, short, and frequent expirations, in which the expired air, in passing through the larynx, produces a peculiar sound. This is not a correct definition. One of the most constant phenomena

accompanying coughing is a momentary occlusion, or at least, a considerable contraction, of the glottis. This contraction does not concur alone in the production of the peculiar sound observed; it prevents the egress of air, which afterwards escapes with great rapidity, thus more easily, by communicating to it the impulse which it receives, carrying with it the mucus adherent to the parts in its course.

Many varieties of cough have been admitted, of which the principal are the idiopathic* and sympathetic, moist and dry cough. If the exciting cause of the cough be seated in any of the air passages, it is idiopathic: it is called sympathetic when it depends upon an affection of some viscus more or less remote. The idiopathic cough may be guttural or pectoral, according as the irritation which excites it, is above or below the glottis. The sympathetic also varies with the organ which causes it. That arising from an affection of the stomach, has been called *stomachal* cough: it is said to be dry, to increase after a meal, to be accompanied with epigastric pain, nausea, and retching, and to be unaffected by cough medicines and mucilaginous preparations, but to yield to acid drinks, emetics, and spontaneous vomiting. A *verminous* cough has been admitted, supposed to be connected with the presence of worms in the digestive canal, and which their expulsion will alone remedy. Certain diseases of the liver give rise to a cough called *hepatic*. A similar effect has been known to follow certain affections of the uterus. *Dahaen* relates the case of a woman, who was, for a long time, affected with continual coughing, and who was not relieved of this troublesome symptom, until the spontaneous expulsion of a fibrous tumor from the uterus.

The *moist* cough (*tussis humida*) is that which excites a more or less abundant excretion of mucus by the mouth; in the *dry* cough (*tussis sicca*) there is no excretion. In most cases, the cough occurs but once or twice in succession, then ceasing, to return again at a more or less remote period. When the cough is both dry and obstinate, the term *ferine* has been applied to it (*tussis ferina*). In many diseases, it occurs rapidly many times, so that a single inspiration is followed by five or six successive expirations, constituting *paroxysms of coughing* (*tussis accessus*). It is, in such cases, accompanied with redness of the face, watery eyes, headache, tinnitus aurium, fullness of the cervical veins, retching, and sometimes vomiting, as is noticed in pertussis, phthisis pulmonalis, and some varieties of bronchial catarrh. Finally, the cough, in certain affections, presents a peculiar tone and rhythm easily distinguishable, but difficult to describe. Thus

* The word idiopathic has been generally employed as synonymous with essential, and applied to diseases rather than symptoms. But this word being evidently the opposite of sympathetic, and it being impossible, in the present state of the science, to apply the latter word to a disease, we have thought it more proper to apply these two words to symptoms, reserving for disease the words essential and symptomatic, these alone being suitable to the present state and deficiencies of the science.

in the last stage of phthisis, when the lung has become filled with numerous and large cavities, the cough has a peculiarly hollow sound; in laryngeal phthisis the cough is low, hoarse, broken and rough. In croup, it is said to resemble the bark of the dog, the howling of the fox, the crowing of the cock, &c. Nothing precise is indicated by these terms of comparison.

The exploration of the cough by auscultation, furnishes some remarkable phenomena. The various kinds of rhonchus are generally more marked during coughing than during respiration: thus in incipient pneumonia and in the same disease when on the decline, the crepitant rhonchus is often imperceptible, except during cough, or the full inspiration which follows it. In phthisical patients, if the ear be applied over the ulcerated cavities, a gurgling is sometimes distinguished during the cough, which is entirely imperceptible in the ordinary movements of respiration. In some cases, instead of the gurgling, the fluctuation of a liquid is audible; this sound is similar to that produced by emptying a bottle of the liquid it contains.

Expuition (*expuitio*) is the act by which the matters accumulated in the pharynx are rejected: it is by means of the guttural cough, that expuition is effected. The mucus of the posterior part of the nasal fossæ, which is carried back into the throat by a peculiar inspiratory effort, a sort of snuffing, that of the bronchi, which is forced up into the pharynx by the pectoral cough, are both rejected in the act of expuition.

Expectoration (*expectatio*), a term which has been improperly applied to the *expectorated matter*, is the act by which matters contained in the trachea, and particularly the bronchi, are expelled from them. This occurs in three different ways: 1. When the bronchi contain but a moderate quantity of sputa, they are forced by the pectoral cough into the pharynx, thence into the mouth, and are finally rejected. 2. In cases in which a great quantity of liquid is suddenly or rapidly poured into the bronchi, as in certain cases of hæmoptysis, or the rupture of an aneurismal cyst or pleural abscess into the air passages, the expectoration resembles vomiting; the lungs, strongly compressed by an almost convulsive contraction of the expiratory muscles, transmit this compression to the bronchi; the liquid with which they are filled escapes through the glottis, and issues in abundance from the mouth, and sometimes from the nose: this is a kind of pectoral vomiting; in such cases the patient is often said, both by the physician, and others, to have vomited blood or pus. In nursing infants and children previous to the fifth or sixth year of age, expectoration rarely occurs in any other way. At this age, the sputa are generally expelled by pectoral vomiting which follows the efforts to cough: in other cases, after being forced into the pharynx by the pectoral cough, they are carried by deglutition into the stomach, whence they pass into the intestines or are rejected by vomiting, properly so called. 3. In other cases, in which the quantity of fluid exhaled is small in quantity, it sometimes happens that this liquid rises

gradually into the larynx and even the pharynx, without exciting any cough, and is expelled by simple exspuition. This mode of excretion, which is not uncommon in hæmoptysis, it is difficult to comprehend, particularly in the vertical position. Some physicians have supposed, it is true, that, in such cases, the expectorated matter is secreted in the larynx; but this supposition, which is without confirmation, leaves still unexplained the ascent of the blood or mucus. It seems to us, on the contrary, that it may be understood by taking into account, 1, the form of the air passages, which, being narrow at their termination, become gradually larger, to their junction with the trachea; 2, the compression which they undergo at each expiratory effort; 3, the specific lightness of the mucus, by its admixture with the air; 4, and particularly the difference in the duration of inspiration and expiration: the latter being short, the air issues from the air passages with more velocity than it enters them, necessarily communicating to the matters contained in the bronchi and trachea an ascending movement, which more than counteracts that imparted to them by inspiration.

Thus, sometimes, matters, when poured in abundance into the bronchi, are carried into the mouth by a single impulsion, as is observed in certain cases of hæmoptysis and emphysema, in which the blood and pus are suddenly rejected in great quantity; they are sometimes arrested, as before stated, in the pharynx, and afterwards forced by exspuition into the mouth, whence they are rejected from the body.

The act by which the mucus lodged into the mouth or exhaled into this cavity is rejected, is called *spitting* (*excreation*). When this is often repeated, the phenomenon is termed *crachottment*; it occurs particularly in gastric derangement, and in cases in which the mouth is bitter and pasty, and in nausea. Spitting, exspuition and expectoration have this in common, that they may be produced by a rapid expiration; but the cause which produces expectoration is below the glottis, that which excites exspuition is above, and that of spitting is in the mouth; in the first case, the obstacle which augments the force of the expired air is the glottis, in the second, the isthmus of the fauces, and in the third, the lips.*

Expectoration, exspuition and spitting may be *rare* or *frequent*, *easy* or *laborious*, and sometimes *impossible*. They are often accompanied with *pain*, as is observed in peripneumonia, angina and inflammation of the tongue.

The term *sputa*, is applied to the matters which come from the bronchi, trachea, larynx, pharynx, isthmus of the fauces, and the posterior part of the nasal fossæ or mouth, and which are rejected through the opening of this latter cavity, commonly in a liquid form, and in small masses at once. These matters are generally the result of a morbid secretion of the mucous membrane which covers these organs, or of their glands and follicles; they may

* The words *exspuition* and *spitting* having been vaguely employed by authors, we have thought it better to give them a precise signification.

also be formed in the substance of these parts or proceed from those more remote, having forced a way into their cavity.

The formation of sputa is not incompatible with health. There are many persons, who every day reject a certain quantity, either from the mouth or pharynx, or from the trachea or bronchi, without being supposed to suffer from disease.

The sputa present remarkable differences, according to the parts from which they proceed. In order correctly to appreciate their different qualities and quantity, the physician should require that there be a vessel for the exclusive purpose of receiving them.

Their qualities can be but imperfectly determined when mixed with urine, or received upon a cloth which absorbs their more fluid portion.

The sputa formed in the mouth, are more often owing to an increased secretion of the mucous membrane, than to that of the parotid, submaxillary and sublingual glands. They are commonly clear and almost serous, like the saliva itself; they rarely acquire much consistence or opacity, unless in acute diseases of the gravest character. They may flow from the mouth, by their weight alone; they may be drawn out without the assistance of the organ which contains them; but they are generally expelled by the peculiar act to which the term *spitting* or *sputation* has been applied.

The sputa from the isthmus of the fauces and pharynx, are generally owing to inflammation of these parts; they are clear, tenacious and ropy, sometimes mixed with small cheese-like lumps, which proceed from the follicles of the tonsils, and in certain cases, with pus, formed, either in the tissue of these glands, or in the substance of the velum pendulum palati, or, what is rare, in the parietes of the pharynx, and are rejected by expectoration.

The sputa which come from the larynx and trachea are generally small in size and quantity, and differ but slightly from those furnished by the bronchial ramifications in analogous affections.

The study of the latter (expectorated matters) is of the highest importance in all respects; they are generally the result of a morbid secretion of the mucous membrane; but in many cases, they proceed from other parts, particularly the parenchyma of the lungs, and the pleura; and sometimes from the neighboring large arteries, liver, or the cellular tissue which unites this viscus to the diaphragm.

The sputa, considered independently of their origin, and in regard only to their physical qualities, present numerous varieties, which have received distinctive appellations.

They are called *serous*, when clear and resembling water; *mucous*, when of a thicker consistence; and *viscid*, when adherent to the vessel in which they are contained: this viscosity is sometimes so great that the vessel may be turned upside down, without their becoming detached, or even, in some cases, their molecules moving among themselves. The sputa are called *sanguinolent*, when they consist of a mixture of blood and mucus, as in pneumonia;

bloody, when they contain pure blood, as in hæmoptysis. They are said to be *spotted* or *streaked with blood*, when this liquid appears in small masses or in *streaks*, as in severe bronchitis; *frothy*, when mixed with bubbles of air, giving them the appearance of froth; *purulent*, when they contain pus, and *puriform*, when they only appear to contain it.

Their *color* also presents numerous varieties; they may be white, yellowish, rusty, greenish, red, brown, black, or gray; in some cases, transparent, in others opaque, and often, colorless. They may also present different shades of color at once. Their *form* is generally rounded when they are easily detached from the mouth, and not adherent to its sides; they are, on the contrary, elongated, stringy, or stellated, when viscid; this latter form is frequently observed in typhoid fever. They are sometimes firm, distinct, and almost hemispherical; sometimes frothy, flattened, and run together so as to form an homogeneous mass. They vary also in *consistence*; this is, in some cases, aqueous, in others, similar to that of a solution of gum arabic, the white of an egg, or even gluey; they are still thicker in some cases of chronic catarrh, in which they appear nearly solid. Their odor is generally slight; it is sometimes ammoniacal, fetid and alliaceous like that of the breath. (p. 137.) Their *taste*, in some cases, is sweetish; in others, saltish, bitter or sour; but the taste generally attributed by patients to the sputa, is rather that of the coat which covers the lining membrane of the mouth, or the drinks which they take. In some persons, the sputa cause a sensation of cold, or heat in the parts over which they pass; but their *temperature* is generally that of the body. Their *volume* varies in the same persons; in some, however, they are extremely small, or are remarkable for their large size; in the latter case they may form discs, from one and a half to two inches in diameter. They vary also in *quantity*; being small from some patients each day, while others are spitting continually, so as to fill the vessel several times in the course of twenty-four hours. It should also be remarked that in the same individuals, the sputa may differ widely, in all respects, not only in the different periods of the same disease, but also in each *nycthemerum*;* they are generally more abundant, consistent, more opaque and more easily rejected in the morning than at other periods of the day. Finally, it is not uncommon for the same individual to reject, in the course of a few minutes, several sputa, differing from each other principally in regard to their color and consistence. These differences are still more marked in patients, who, already affected with a chronic disease of the lungs, are attacked with acute inflammation of these viscera: in such cases, the sputa resemble those from two different patients who make use of the same spit-cup, but are in fact the result of two diseases of the same organ, in the same individual.

To these considerations respecting the various appearances of the sputa, we shall add others which are the consequence of the first,

* Νύξ, night; ἡμέρα, day.

and which enable us to determine, from their inspection, *the organ from which they proceed*, and *the nature of the disease with which that organ is affected*.

The manner in which the sputa are rejected often suffices to indicate their origin; those that are rejected by simple *sputation*, or which flow out of the mouth, by their own weight, originate in this cavity; those which have been forced by a sort of *snuffing*, or by *exspuition*, into the mouth, proceed, in the first case, from the nasal fossæ, in the other, from the larynx or pharynx; those which are carried into the mouth by the pectoral cough (*expectoration*), come from the trachea or bronchi, into which they have been exhaled or poured, owing to grave alterations of the pulmonary parenchyma, pleura, and even more remote organs. It is useful, though not always indispensable, for the physician to know the manner in which the sputa are rejected, in order to ascertain their origin; their inspection alone suffices for the solution of the double problem, under consideration.

The *serous* and *frothy* sputa sometimes originate in the mouth, and sometimes in the bronchi. In the first case, if the mouth be free from all lesion, they indicate, either an affection of the stomach, or, in the woman, pregnancy. If the membrane of the mouth be of a bright red color, they announce an approaching apthous or pseudo-membranous eruption; if they are owing to mercurial influence, the swelling, redness, patches, whitish excoriations, and the specific odor of the mouth, would enable us to distinguish them from the first. The serous and frothy sputa, the result of expectoration, are observed in pleurisy and incipient bronchial catarrh. In the former case, their quantity is very small, in the latter, it may be very considerable.

The *mucous* sputa generally come from the larynx, pharynx, bronchi or nasal fossæ. Some patients reject every morning on awaking, one or two small, rounded and dried mucous masses; these generally come from the nasal fossæ, and are formed during the night upon the free border of the velum pendulum palati, whence they are forced into the pharynx and rejected.

The mucous sputa which originate in the pharynx are generally viscid, transparent, contain but little air, and are rejected by exspuition and with an expression of pain. The mucous sputa which come from the larynx are generally smaller in quantity, and accompanied with some alteration of the voice. Patients not unfrequently cough up sputa, formed by the union of small transparent globules of a grayish or slate color, which resemble *starch* or *tapioca*, and whose origin is somewhat obscure. They are thought by some physicians to come from the larynx; the numerous follicles with which the isthmus of the fauces is furnished, would lead us to suppose that here might be their origin.

The mucous sputa secreted in the bronchi are generally of a larger size, a rounded form, which they preserve in the vessel, and a color varying with the nature and period of the disease. They are transparent in recent catarrh; transparent, viscid and stellated in typhoid fever; and opaque in chronic catarrh.

Many persons, in health, every morning reject several sputa, of a grayish or blackish color; this color is owing to the smoke which collects from lamps, candles, &c., particularly in small apartments.

In many diseases, the sputa are *purulent*; the product of the secretion of the mucous membrane lining the air passages, may also in some cases present the appearance of pus which arises from ulceration, tubercular softening, or the rupture of an abscess in the neighboring parts. The importance of distinguishing between purulent sputa and those simply puriform, has been long recognized, and attempts have been made to find some sign distinctive of each. Numerous chemical experiments have been tried; the microscope has been employed in the examination of mucous and pus, but no satisfactory results have as yet been obtained; it is for this reason that we have considered the sputa presenting these characteristics in connection with each other.

Pus which escapes *suddenly* and in abundance from the mouth (*vomica*) always comes from the pleural cavity, and has been transmitted into the bronchi by means of a perforation of the pulmonary parenchyma, being generally owing to tubercular ulceration which has made an opening, either at once or successively into the pleura and a bronchial division. The signs of pneumothorax soon appear, to confirm the diagnosis already established from the vomiting of pus, which is sometimes preceded and announced by the gurgling mentioned above. When pus or a puriform liquid is *rejected from the mouth in abundance*, (eight or ten ounces in the twenty-four hours,) *but by successive efforts* and in small quantities at a time, we may infer that it either proceeds from the pleura, as in the preceding case, or from dilated bronchi. Auscultation and percussion show to which of these two affections these sputa should be referred.

Pus when rejected *pure*, but in small quantities, may be owing to one of the two preceding diseases, or to one or more tubercular cavities. If the sputa be very fetid, they come from dilated bronchi or the cavity of the pleura; if they do not possess this peculiarity, they may originate in one of these two sources, or a tubercular cavity. The progress of the disease and the exploration of the chest can alone enable us to decide these various points.

Sputa which contain only *streaks* or *dots* of pus commonly mixed with mucus, and which are rejected by expectoration, may proceed from the larynx or lungs. The sensation which precedes and excites their expulsion, the alteration of the voice, the small size and quantity of the sputa, generally indicate their origin to be ulceration of the larynx of a tubercular or syphilitic nature. If the expectorated sputa be voluminous and abundant, if they present opaque streaks which are parallel or zigzag in their disposition in a mass differing in opacity, and swimming in a clear and serous liquid (*pituite diffuente*), they generally proceed from tubercular softening; as the disease progresses, the proportion of the clear and serous fluid diminishes, while that of the purulent matter increases; so that in the last period, the sputa no longer

contain the clear fluid and are free from *stria*, presenting the appearance of homogeneous pus, but not mixing with water, and affecting but slightly, if at all, its transparency.

There is a disease in which the sputa present so close a resemblance with those of phthisis, that a physician ignorant of this fact, would not hesitate, from inspection of the expectorated matters, to affirm that they belonged to the latter disease. It is in the rubeola of adults, that this peculiarity is noticed. In this case, however, the fluid, in which the solid portions of the expectoration float, is slightly turbid or opaque, while in phthisis it is always transparent.

Pure blood, when it issues from the mouth *in abundance*, with cough, ordinarily comes from the bronchi; it may, however, also come from the nasal fossæ, but in this case, if the head of the patient be inclined forward, the blood will flow from the nostrils as well as the mouth, leaving no doubt as to its source. The blood which comes from the bronchi in large quantities may be the result of a simple exhalation which, in some cases, replaces some other suppressed hæmorrhage, but it is generally connected with the presence, in the lungs, of tubercles in their crude or softening stage, or it may also proceed from the rupture of an aneurismal tumor into the air passages. In the latter case, a sudden and fatal hæmoptysis is sometimes the first sign of arterial lesion.

Pure blood, when thrown up in *moderate* quantities, may proceed from the same sources, not excepting the latter. We have seen, in the case of a porter at the Hospital de la Charité, who presented all the signs of an arterial aneurism of the chest, the occurrence of moderate hæmoptysis which recurred at intervals during the few weeks previous to his death. On examining the body after death, a perforation of the aneurismal sac and trachea at their point of contact was discovered together with such a disposition of the fibrinous concretions as to form an incomplete and movable partition, which alternately permitted and prevented the escape of arterial blood into the trachea. In this case, as in many others, the concretions formed an imperfect substitute for the coats of the artery, thus retarding the death of the patient.

Moderate hæmoptysis may be also connected with an organic lesion of the heart. In all cases, the careful exploration of all the circumstances which accompany the hæmorrhage is indispensable, in order to determine its seat and nature.

In many cases, the blood is rejected mixed with other liquids, as saliva, mucus, and pus.

Blood which is rejected by sputation comes from the mouth; it sometimes precedes and announces the opening of an abscess of the alveoli or tonsils; it may also arise from suction of the gums, a physical lesion of any part of the mouth, and scorbutic swelling of the gums: in the latter case, it has a peculiar odor, is clear, and of a serous consistence; it often fills the mouth on awaking, and does not flow during the waking state, except on pressure of the gums.

When blood appears in the sputa in the form of blackish spots, it generally proceeds from the nasal fossæ; when in narrow streaks, it almost always depends upon the efforts of the patient in exspuition or expectoration in cases of angina, catarrhal, parenchymatous or serous inflammations of the chest.

Sputa formed by an intimate admixture of blood with mucus, are of the highest importance in a semeiological point of view; they may in some cases reveal the existence of an inflammation of the pulmonary parenchyma, when there is no pain in the side, no considerable difficulty of breathing, nor any phenomena of auscultation or percussion to indicate such a lesion. Sputa which are viscid, transparent, mixed with small air bubbles, and of a red, yellow, or greenish color, clearly, and with certainty, indicate the existence of pneumonia; those which resemble a thick solution of gum arabic, are of a red color, and with or without a frothy appearance of their surface, are also characteristic of pneumonia, although not very viscid, and often deprived of air; the same is true of serous sputa of a reddish or brownish color (*juice of the prune or liquorice*), which announce a near and almost inevitably fatal termination of that disease. The sputa of pneumonia, however, do not constantly present a reddish, yellow, or green color; there are some persons in whom, towards the decline, and even during the whole course of this disease, the sputa are thick, transparent, and presenting so remarkable a degree of viscosity, as to roll about in the spittoon, leaving it almost dry and free from stain.

In some cases, and particularly at an advanced stage of pulmonary phthisis, the sputa appear to consist of a mixture of blood and pus; being opaque or of a dull red color, resembling chocolate.

The *false membranes* which are sometimes thrown out with the sputa, may come from various sources. That they occasionally proceed from the mouth and throat is evident from simple inspection of these parts. The absence of membranous productions in the mouth and throat shows that they come from some part of the air passages below the epiglottis; their form and size sometimes enable us to determine their source. An alteration of the voice generally indicates, in such cases, that they proceed, at least in part, from the larynx.

The sputa sometimes contain hard and concrete matters, having a *calculous* or *osseous* appearance, as portions of dental tartar, small calculi formed in the salivary glands and canals, sequestra proceeding from denuded and ossified cartilages of the larynx, osseous or stony fragments developed in the bronchi, tubercular or melanotic products and hydatids. The portions of tartar are easily recognized by their peculiar form, and the depression they leave in the part of the gum which they occupied; *salivary calculi* are at once distinguishable by their form and the lesion of the organs in which they were developed. A sequestrum formed in the larynx generally produces, before its expulsion, severe

accidents, and particularly violent fits of coughing, sometimes threatening suffocation; the flattened form of these fragments assist in their diagnosis. *Bony* or *calculous concretions* formed in the lungs have almost always a branching form which distinguishes them from all others. Hydatids are easily recognized; they may come from the lungs or liver; the concomitant signs generally enable us to determine in which of these two organs they were formed. In regard to the presence of tubercular matter in the sputa of phthisical patients, some physicians consider it common and easily distinguishable. We are not ourselves of this opinion; during the thirty years in which we have daily and carefully examined the sputa of these patients, we have never been able to distinguish these pretended melanotic and tubercular fragments.

Lastly, the *odor* of the sputa furnishes important signs. In the mercurial and scorbutic swelling of the gums, and in certain syphilitic ulcers of the throat, the excretion exhales the same odor as the mouth: a *fecal* odor of the sputa generally indicates the presence of pus which proceeds from the mouth and isthmus of the fauces. The *alliaceous* odor is peculiar to pus formed in the pleura, and rejected through a perforation in the pulmonary parenchyma. In gangrene of the lungs the odor is not less characteristic. A urinous fetor of the sputa should lead us to suspect a lesion of the pleura analogous to that described by Dahanen, (a renal abscess opening into the bronchi, through the diaphragm and ulcerated pleura and lung of the left side.)

SECTION THIRD.

Symptoms furnished by the Circulation.

The circulation which consists in the progressive movement of the fluids continually carried from all parts of the body towards the heart by means of the veins and lymphatic vessels, and those carried from the heart towards the capillary system by means of the arteries, is performed, in health, without derangement, and in harmony with the organs which concur in its production. Under the influence of disease, this function presents numerous derangements; some evidently affecting the entire circulation, or at least that of the blood; others being alone appreciable in certain organs, as the heart, arteries, or veins.

The course of the blood may be accelerated through all its canals, as is observable in most acute diseases, in which the pulsations of the heart cannot increase in strength and frequency, in a given time, without compelling the veins to furnish, and the arteries to receive, a corresponding supply of blood. A general sluggishness in the movement of the blood is equally appreciable under opposite circumstances.

The force of the circulation may be increased or diminished in

all parts of the circulatory system. We daily see persons in whom, while the pulsations of the heart and arteries are stronger than in health, the veins are harder and more voluminous, and the capillary system more injected, as is apparent in the increased color and marked tumefaction of the integuments; these phenomena are particularly remarkable in the affection known as inflammatory fever. In other diseases, on the contrary, and particularly chronic affections without febrile reaction, the impulse of the heart is almost imperceptible, the pulse soft, the veins flabby or hardly apparent, the skin pale or unequally colored and often covered with livid or blueish patches which indicate the languor of the capillary circulation. Lastly, in some cases, the course of the blood may be momentarily suspended in all parts of the circulatory system, as in syncope, in which the pulsations of the heart and arteries cease, and the blood no longer flows from orifices made in the veins.*

Notwithstanding the necessary and reciprocal dependence of the different parts of the circulatory system upon each other, we are led from many facts to admit that *each of them*, as Laennec has observed, has also a *peculiar existence*, which is more apparent in the pathological, than in the healthy, condition. It appears certain, for example, that the capillary circulation is not entirely dependent upon the arterial and venous circulation; partial congestions of blood in the capillaries of certain organs, hæmorrhages which occur in any part without apparent disturbance of the rest of the circulatory system, stasis of the blood in the capillaries of inflamed parts, all tend to confirm this opinion. The *independence* of the arterial system has not been as generally admitted; it having been shown, however, by auscultation, in certain cases, that the arterial pulsations were remarkably strong, while those of the heart were extremely feeble, Laennec was led to conclude with some other physiologists, that the arteries also have a special action, a contractility peculiar to themselves. The action which the veins exert in counteracting the influence of gravity and temperature, would show that the course of the blood in these, is not entirely subordinate to the general circulation.

We shall now proceed to examine successively the symptoms furnished by each of the organs of circulation, the heart, arteries, capillary system, veins, and the lymphatic vessels and glands.

§ I. *Circulation of the Blood.* — A. The pulsations of the heart may become variously deranged.

Many of the symptoms of which it is the seat, have claimed the attention of physicians of all ages, particularly in the diseases which affect this organ itself. The force and feebleness of its pulsations, their regularity, the place and extent in which they are

* Many persons have been able to suspend for a certain time, by an effort of will, the motions of the heart and the arterial pulsations; some have died in attempting to repeat this dangerous experiment.

felt, have been carefully investigated by observers, and added as signs of more or less importance to the history of these different lesions. Many practitioners have for a long time been in the habit of examining this organ by the immediate application of the ear over the region which it occupies; but it is to the work of Laennec that we are indebted for the accurate knowledge and appreciation of this, as also many other pathological phenomena.

The pulsations of the heart should be examined with reference to the four following points, viz: the extent and place in which they are audible, the stroke or the force of the impulse of the organ, the nature and intensity of the sound, and finally, the rhythm according to which these different parts contract.

1. In a healthy man, and in the adult age, the pulsations of the heart are only audible in the space comprised between the cartilages of the fifth and seven true ribs, and in the corresponding points of the sternum. The pulsations of the left cavities are principally felt in the first, and those of the right in the second point. This space in which the motions of the heart are perceptible is much more limited in very fat subjects, and those who have been subjected to repose and diet; it is greater in lean individuals, whose chests are narrow, in children after exercise or meals, or under the influence of a lively emotion. In these cases, the pulsations may be perceptible over the greater part, or even the whole of the left side. When under the influence of disease, the pulsations of the heart are audible over a greater extent than in health; they become progressively perceptible, 1, in the left side of the chest, from the arm-pit to the region of the stomach; 2, in the same region of the right side; 3, in the posterior part of the left chest; 4, in the posterior right chest. When perceptible over a greater extent in disease, they depend upon a lesion of the heart itself, and, according to some authors, to lesions of the neighboring parts. Laennec thought that induration of the pulmonary tissue, effusion of serum into the pleura, and the presence of tubercular cavities, might occasion this phenomenon; but generally, in these cases, the difference is not well marked and often doubtful: it is particularly in the heart itself that are found the causes which increase the extent over which its pulsations are felt. It was the opinion of Laennec that this extent was in direct ratio with the feebleness and thinness of the parietes of the heart; that the size of the heart does not affect the extent over which the pulsations are perceptible, unless accompanied with enlargement of its cavities. The transmission of the sounds of the heart appear to us also to depend upon certain conditions presented by the chest, and which render it more fitted to conduct the sounds produced within its cavity. There are some individuals in whom, when in a state of complete physical and moral quiet, the pulsations of the heart are transmitted to almost all parts of the chest, although presenting in the precordial region no more than their ordinary force, and unaccompanied by any signs of disease, either of the heart or other thoracic organs.

The space, in which the pulsations of the heart are audible, may become diminished; this is observed in rare cases of atrophy of this organ.

The cardiac pulsations may be perceptible in a place differing from that where they ordinarily appear. This phenomenon may be owing to a general transposition of the viscera; such cases are congenital, and present nothing morbid. But generally, when the pulsations are perceptible above or below, to the right or left of the place where they are ordinarily felt, the phenomenon is owing to some pathological condition. The presence of a tumor or the accumulation of fluid in one side of the chest, in the mediastinum or abdomen, are the more common causes of this displacement. In some cases, the pulsations differ in their place of appearance at different times; this phenomenon which authors have considered as peculiar to hydropericardium, is very rare, and difficult to detect.

2. The *beating* or *impulse* is a sensation of percussion conveyed to the ear, or hand of the observer, by the cardiac pulsations.

When the conformation of the heart is in perfect harmony with that of other parts, this impulse is almost imperceptible; often entirely so; it increases under the influence of the causes which hasten the pulsations of this viscus, and becomes again natural when these cease to act.

In hypertrophy of the heart this impulse generally becomes stronger as the thickness of the parietes of this viscus is increased; and is sometimes carried to such a degree as to heave the head of the observer; the greater the hypertrophy, the more slowly this heaving takes place. There are, however, numerous exceptions to this; for it is not uncommon to meet with patients in whom the heart has acquired an enormous size, from thickening of its walls and dilatation of its cavities, without any corresponding increase in the force of the impulse; it is even sometimes feebler than in the normal condition.

The impulse is produced at the moment of ventricular contraction. Hypertrophy of the auricles may, however, also give to the ear or hand a very perceptible impulse; but this is deeper and more feeble than that which depends upon ventricular contraction. In health, there is never but one impulse to each systole of the heart; in some diseases of this viscus, succeeding the first impulse which corresponds to the contraction of the ventricles, two others, isochronous with their dilatation, have been observed. M. M. Andral* and Bouillaud† each cite a case of this kind. We have also had occasion in several instances to observe this phenomenon, without being able to find by comparison of the symptoms and anatomical lesions, a satisfactory explanation of this triple impulse.

The impulse is ordinarily confined to the precordial region; it sometimes extends to the neighboring portion of the sternum and

* Notes a la quatrième édition de Laennec, t. iii. p. 26.

† *Traité clinique des Maladies du Cœur*, t. 1, p. 148.

epigastrium, rarely beyond, unless the heart be both thickened and dilated.

The absence of impulse, like that of sound, in the precordial region depends, either upon a natural feebleness in the contractions of the heart, or rather upon the position of this viscus, it being situated deep in the mediastinum, and entirely covered by the lungs, an anatomical disposition not unfrequently occurring, and which is sometimes produced by pulmonary emphysema. The impulse of the heart is also wanting in cases of considerable effusion of liquid into the cavity of the pericardium.

3. *Nature and intensity of the sound.* If the ear or stethoscope be applied to the region of the heart in a healthy person, two successive, and different, sounds are heard; the first, is dull and prolonged, coincides with the ventricular systole and is isochronous with the pulse. Succeeding this, is another, which is clearer and smarter, being analogous to the sound produced by the flapping of a bellows' valve, and occurring during the diastole of the ventricles. Many theories have of late years been proposed by physicians and physiologists, in order to explain the mechanism and cause of these two sounds. They have, by some, been referred to the contraction of the auricles and ventricles, by others, to the impulse of the blood against the parietes of the heart and great vessels; others have attributed them to the collision of the particles of this fluid with each other, and again others to the successive impulse of the point and base of the heart against the anterior parietes of the chest; but the theory of Roannet, which refers the sounds of the heart to the action of the valves is that which at present is most generally admitted. According to this physician, the first sound is produced by the closure of the mitral and tricuspid valves; the second, by the sudden closure of the sigmoid valves of the aorta and pulmonary artery. This theory is favored by the greater number of pathological facts; there are however many abnormal sounds of the heart, which cannot be explained by this, or any other yet proposed.*

In health, the two sounds of the heart have each a peculiar character, which, in disease, may become variously modified. At one time, the sounds become duller or more clear; at another, they are replaced by others which have received various names. It is exceedingly rare for the both sounds to be altered at the same

* From the highly interesting and conclusive experiments of Drs. Pennock and Moore, of Philadelphia, and the committees of the British Association, it would appear that the first sound of the heart is probably caused by a combination of that caused by the contraction of the auricles, the flapping of the auriculo-ventricular valves, the rush of blood from the ventricles, and the sound of muscular contraction. But it is to the latter that it appeared mainly attributable, its dull sound and prolonged duration being owing to the progressive character of the full systolic effort from fundus to apex.

The second sound, according to these experiments, is caused exclusively by the closure of the semilunar valves, from the reaction of the arterial columns of blood upon them. The cause of the second sound corresponds nearly with Roannet's theory. — TRANS.

time; in most cases, one alone presents modifications in its tone, nature or duration.

The sounds of the heart are dull and stifled, in cases of considerable hypertrophy, thickening of its valves, or when the free play of the latter has been obstructed by the formation of concretions upon their surface. In those cases, they are sometimes dry and hard, a modification to which M. Bouillaud has applied the term *bruit de parchemin** or *parchment sound*.

Increased *clearness of the sounds* is a very rare phenomenon; it is however observed in dilatation with attenuation of the parietes of the heart.

It frequently happens that the sounds of the heart are replaced or masked by a *bellows murmur*, so called from its exact resemblance to the sound of that instrument. This murmur is loud or feeble, sometimes just perceptible, and sometimes confined to a limited space, or extending over the whole precordial region; in the latter case, there is generally some point in which it presents its maximum intensity, a circumstance which may be of importance in the diagnosis of the disease. In some very rare cases, both the normal sounds of the heart are masked or replaced by this murmur, which may lead us to suspect, either the simultaneous alteration of both orifices, the arterial and auriculo ventricular, or a twofold alteration in one of those orifices, causing its contraction, and inefficiency of its valves.

The bellows sound whatever be its degree of intensity, is not pathognomonic of any particular disease of the heart, for while, on the one hand, it may exist in nearly all the affections of this viscus, on the other, it fails in some of the most severe, and particularly in contractions of its orifices. The bellows sound may exist in simple pericarditis, hypertrophy, and particularly that form called concentric hypertrophy. But it is most often found in fibrous, cartilaginous or cretaceous contractions of the orifices, and inefficiency of the valves. It also frequently exists in cases in which the action is increased without any material lesion of its tissue, as in nervous palpitations. Finally, it may be heard in plethoric individuals, pregnant women,† but particularly in anemic persons, in young girls affected with chlorosis, and after abundant hæmorrhages, as has been shown by the observations and experiments of Dr. Marshall Hall, of London.‡

It follows from these facts, that the bellows murmur may be developed in various and even opposite conditions; how uncertain then are all those explanations in which this sound is attributed to a single mechanism.

Many other sounds have been revealed by auscultation, which Laennec has justly considered but varieties of the bellows sound, and which have been designated by the terms, *filings* (*bruit de lime*), *rasping* (*bruit de rape*), *sawing* (*bruit de scie*), and *musical*

* *Traité des Maladies du Cœur*, t. 1, p. 162.

† Vide a good thesis by M. Jacquemier Paris, 1837, No. 366.

‡ *Med. chirurg. trans.* t. xvii.

or *whistling* sounds. The *rasping* or filing sound gives to the ear a sensation of harshness or roughness, which has been compared to the sound produced by filing wood. If, in these cases, the hand be applied to the precordial region, a peculiar vibration is felt called the *purring tremor* (*premiement cataire*), first pointed out by Corvisart, and which Laennec compared to the purring of cats. The *sawing* sound closely resembles the sound of the saw, when heard at a little distance. It has also been compared by M. Bouillaud to the sound of the letter S, when prolonged. The whistling or musical sound which Laennec never distinguished except in the arteries, we have several times observed in the heart itself; in one case it was so intense as to be heard at the distance of several feet.

The rasping, filing and sawing sounds and the purring tremor are most commonly heard in contraction of the orifices, particularly if the valves present cretaceous, rough or unequal indurations. We have, however, several times observed the rasping sound in cases of anemia, and after abundant bleeding. The same phenomenon has been noticed under similar circumstances of Dr. Marshall Hall.

The musical or whistling murmur of the heart has not been connected with any distinct lesion of this viscus; in the two cases which had presented this phenomenon and in which an autopsy was made, the existence of hypertrophy with dilatation of the left cavities was discovered, without lesion of the orifices.

We shall close the history of the abnormal sounds of the heart, by briefly noticing the *bruit argentin*,* or *silvery sound*, pointed out by Laennec, and the semeiological value of which is not yet determined. It may be imitated, says M. Filhos, by placing the pulp of the middle finger just within the meatus externus, so as completely to close it, and at the same time tapping it lightly with the other hand.† Most authors have considered this sound as peculiar to hypertrophy, occurring when the contractions of the heart have become very powerful. Laennec supposed it to be exclusively owing to the presence of air bubbles within the pericardium, together with hypertrophy of the heart; but this opinion has not yet been verified by autopsies. M. Bouillaud attributed the same phenomenon to the stroke of the heart against the thoracic parietes. He thought that the silvery sound which is always produced during the ventricular systole, was only a sound superadded, and which does not render the two normal sounds inaudible.

If, in the healthy condition, the *gliding* of the heart within the pericardium be unaccompanied by any appreciable sound, this is no longer the case after the formation of false membranes upon the serous envelope of the heart, which destroy its smoothness, and which are the result of inflammation. Thus abnormal sounds may be produced in the pericardium, as in the pleura, and under

* This is the *metallic tinkling* of Bouillaud, or the *auriculo-metallic sound* of M. Filhos.

† Thèses de Paris, 1833, No. 132, p. 14.

the same conditions. These sounds were observed by Laennec, but he did not attach to them due importance. He speaks of a sound of leather, which he at first thought depended upon pericarditis, but which he afterwards confounded with the metallic tinkling, attributing it to the presence of air bubbles in the pericardium.* M. Collin was the first to give a correct description of this phenomenon, and point out its semeiological value by connecting it with the existence of false membranes, and thus constituting it one of the pathognomonic signs of pericarditis. This sound presents various degrees of intensity; to the feeblest of these, M. Bouillaud proposed to apply the term *grazing* (frolement); he compared this sound to that produced by the rumpling of taffeta, parchment, or a bank note between the fingers; this sound which is very superficial, is heard during the systole and diastole, but is more marked during the former.† The sound of new leather (*cuir-neuf*), investigated by M. Collin, resembles that produced by a horseman on a new saddle. This sound is observed under the same circumstances as the preceding; but it seems to depend on false membranes, which are harder and more resistant. Lastly, when the false membranes have become fibro-cartilaginous, a much ruder sound is produced, for which M. Bouillaud has proposed the term *scraping sound* (*bruit de raclement*).‡ These different sounds are often important in the diagnosis of pericarditis.

4. The term *rhythm*, Laennec applied to the order of succession in the contractions of the different parts of the heart, and to their respective and relative duration. In health, the first or dull sound which coincides with the ventricular systole is nearly isochronous with the pulsation of the radial artery. Succeeding this, is the second or flapping sound, between which and the first, according to M. Marc d'Espine, there is a very short interval of silence, during which, with great attention, the arterial pulsation can be distinguished. To this succeeds a brief, but well marked, period of repose, after which the ventricles again contract with the dull sound and the gradual progression peculiar to them. The contraction of the ventricles, the flapping sound and the pause which succeeds, are not of equal duration. The duration of the first sound is almost double that of the second, the latter being about equal to the interval of repose, and sometimes a little less.

This succession in the motions and sounds of the heart is best distinguished when the pulsations of this organ are fewest in a given time; indeed, when the number of the arterial pulsations becomes much increased, the ear can no longer clearly distinguish the period of silence to which we have just alluded.

In disease, the duration of each sound may become modified; thus, in some cases of hypertrophy, the first sound is so prolonged as sometimes to mask the flapping sound, at the same time short-

* T. 3, p. 5, 4th edition.

† *Traité Clinique des Maladies du Cœur*, t. 1, p. 457.

‡ L. c. p. 193.

ening the period of silence, and rendering it almost imperceptible. A loud and continuous bellows murmur is also not unfrequently heard in the precordial region, which replaces or entirely masks both the normal sounds, together with the interval of silence. We have previously referred to those cases in which the rhythm of the cardiac pulsations is so perverted, that following a single ventricular systole, two, three, or four other impulses coincident with the diastole are distinguished. Finally, the natural rhythm of the heart may be perverted by intermittences, irregularities, or inequalities in its pulsation: the latter may be accelerated or retarded, all which phenomena will be considered in connection with the pulse.

The symptoms furnished by auscultation of the heart should never be separated from those which are the results of percussion. In the healthy condition, percussion over the precordial region gives an obscure sound over an extent not exceeding two inches square. This space increases, and its sound becomes duller, owing to increased size of the heart, or a liquid effusion into the pericardium. In a treatise published in 1826, M. Louis proclaimed the importance of the signs furnished by percussion of the precordial region in the diagnosis of pericarditis; he proved that the more or less rapid increase in the extent over which a dull sound is obtained, is the most certain sign of liquid effusion and, consequently, pericarditis; for an effusion confined to the pericardium is an almost constant sign of inflammation; hydropericardium without inflammation rarely occurs except in cases of general dropsy.

B. The term *pulse* (*pulsus*) is applied to the beating of the arteries produced by the afflux of blood propelled by the heart at each contraction.

Galen was the first to call the attention of physicians to this phenomenon. Those who preceded him have hardly alluded to it, and seem to have overlooked it.

The pulse, in health, is equal, regular, supple, and moderate in strength. The number of the pulsations varies with the age, temperament, sex, stature, idiosyncrasy and other accidental circumstances. It has been for a long time supposed that the number of arterial pulsations, during the first months of life, were about one hundred and forty per minute; at the second year, one hundred; at puberty, eighty; from sixty-five to seventy-five in adults, and from fifty to sixty in old age. But it would appear from works recently published that this estimation of the frequency of the pulse, in the different periods of life, is incorrect. Billard asserts that the frequency of the pulse in the new born infant is often no greater than in the adult, and in forty infants from one to ten days' old, he found eighteen in whom the pulse was less than eighty in the minute.* Dr. Valleix indicates the number eighty-seven, as the medium of the frequency of the

* *Mal. des Enf.*, p. 67.

pulse in infants aged from two to twenty-one days.* Finally, M. M. Leuret and Mitivié, by studying the comparative frequency of the pulse in a great number of persons, both old and young, have shown it to be greater in the former than in the latter, since the mean, in the aged, was seventy-three, and, in the youth, sixty-five.† It would be desirable that the researches upon the frequency of the pulse during the first periods of life, be made upon other than hospital patients, as these are badly nourished, and not in the ordinary healthy conditions. It is also necessary that the results should be deduced from a great number of facts. The frequency is a little greater in women, in individuals of a sanguine or nervous temperament, and, it is said, in those of small stature. It has been shown, by repeated observations, that the proportion of adult subjects in whom the number of arterial pulsations is below sixty, and even fifty per minute, is greater than is generally supposed. There are many persons in whom the pulse is not over thirty-six or forty, in others, it has been observed as high as one hundred per minute. Whitt saw a woman whose pulse, in health, beat one hundred and twenty per minute.

Beside these individual varieties, the number of pulsations becomes increased after a meal, by exercise, emotions, and during pregnancy; it is diminished in the sitting or horizontal posture,‡ by repose, diet, loss of blood, and particularly the use of digitalis; it is not rare however for the pulse to become accelerated after abundant hæmorrhages, and all excessive evacuations. In some persons, the frequency of the pulse during convalescence is less than in health. It has been said that the pulse presents, at different hours of the day and night, slight modifications, which, according to the assertions of Brian Robinson, coincide with those of the barometer and thermometer. But these observations, supposing them to be correct, are unimportant, as offering no useful application. The pulse also presents varieties in different individuals, in regard to the force, regularity and equality of its pulsations; it is highly important for the physician to be acquainted with the normal condition of the circulation of persons to whom he is called in sickness; this knowledge is always useful, and often indispensable in order to appreciate the changes effected in the various circulatory phenomena, and particularly the pulse, through the influence of disease.

I have seen a lady whose pulse, during the paroxysms of intermittent fever, did not beat above sixty per minute, to the great astonishment of her physician. This astonishment would have ceased had he counted the number of pulsations during the intermission, these being not above forty per minute.

There are many precepts which should not be neglected in the mode of *feeling* the pulse.

* *Clin., des Mal. des Enf.*, p. 18.

† *De la Fréquence du pouls.*

‡ *Guy's Hospital Reports*, April, 1836.

The physician should wait till the patient shall have recovered from the emotion produced by his presence, requesting him to preserve absolute silence and to remain in the sitting or horizontal posture. The pulse may be examined at the temples, lateral parts of the neck, arm, thigh, wrist, and wherever the arteries are sufficiently large and superficial; but the radial artery is generally preferred, at the place where it ceases to be covered by the muscles of the fore arm, opposite the radio-carpal articulation.

If the patient be up, he should be placed in the sitting posture; if in bed, he should be upon his back, so that he may neither incline to the right or left, and thus impede the circulation of blood in the arteries. The arm should be placed nearly in a state of extension and sustained in its whole length, so that the muscles may be relaxed. The fore arm should be nearly prone that it may rest upon the cubital edge, and the radial edge be a little raised. Care should be taken that no bandage or clothing impede the flow of blood in the axillæ, at the elbow or any other point. All bandages should be removed so that there be the least possible compression. By means of these various precautions, we may be certain that there is no foreign obstacle to the flow of blood through this vessel.

The artery of the left side should be felt by the right hand, and *vice versa*; the four fingers placed parallel on the same line should be applied over the track of this vessel; the index finger should be nearest the hand of the patient; and the little finger, applied lightly, should be the first to receive the impulse of the blood; at the same time that the four fingers are placed over the radial artery, the thumb, or rather the palm of the hand should rest upon the dorsal face of the fore arm, thus affording a solid support to the fingers by which the pulse is examined. The latter should at first receive a slight lateral movement, in order to ascertain the situation of the vessel. When the fingers are all placed upon the artery, the pressure should be gradually increased and diminished several times in succession, so as to appreciate the influence of the pressure upon it, and thus more easily ascertain its different qualities. Twenty or thirty successive pulsations should, in this manner be examined. It is not without advantage to examine the pulse in the two arms alternately, or at once; it should also, in particular cases, be examined in other places, wherever it may throw light upon the diagnosis. It may be also examined several times, or at least a second time, before leaving the patient. However minute these precepts may appear, they cannot be neglected without inconvenience. It is better to accustom oneself from the beginning to this mode of examining the pulse; it may be then done without effort, and by the simple effect of habit.

The changes effected by the influence of disease upon the arterial pulsations are twofold; those which are appreciable at each beat; and those only perceptible by the comparison of a certain number with each other. To the first series belong quickness and slowness, hardness and softness, fullness and smallness, feebleness and strength; to the second, frequency and rareness, irregularity

and inequality; these different conditions of the pulse will be successively considered.

α. The pulse is *quick* (*pulsus celer*), when the arterial pulsation takes place with quickness; *slow* (*pulsus tardus*), on the contrary, when it is performed more slowly than in health.

Hardness and *softness* of the pulse are characterized by the greater or less degree of tension of the artery during its pulsation. If the beat gives the finger the impression of a hard body striking against it, the pulse is *hard* (*P. durus*); it is *soft* (*P. mollis*) when it gently strikes the finger, and is easily compressible. The *cordy*, *tense* and *resisting* pulse are but varieties of the hard pulse. It would not be impossible, in old persons, to confound, with hardness of the pulse, the resistance which depends solely upon ossification of the arteries. The latter is easily recognizable from the firmness of the parietes in the interval, and their *annular* disposition.

Fullness and smallness of the pulse are measured by the volume which the artery presents in pulsating: the pulse is *full* (*P. magnus*) when the artery is large and full; it is *small* (*P. exilis*) when the pulsations of the artery are slender and weak. The *full*, *developed*, and *great*, are but varieties of the large, pulse; the *contracted* pulse is that which is at the same time small and hard.

The *strong* pulse is characterized by its volume and the force of the pulsations; the feeble pulse by the opposite qualities. *Strength* of pulse (*P. robur*) consists consequently in hardness and greatness united; *feebleness* (*P. debilitas*), in the smallness and softness of the pulsations. The vibrating pulse, occurring in cardiac aneurism, is a very strong pulse; the *depressed* pulse, of diseases which tend to a fatal termination, is a very feeble pulse.

Thus slowness and quickness, softness and hardness, smallness and fullness, are the principal qualities of the pulse, which, by their different degrees and combinations, constitute the varieties appreciable in each pulsation.

There are two other varieties which are sometimes confounded, but ordinarily very distinct; we refer to the trembling pulse and the *pulsus dicrotus*. In both these cases the arterial pulsation is not *single*; it gives in the latter case the sensation of a double beat, which has been compared to the rebounding of the hammer on the anvil. In the first, the pulsation is, as it were, uncertain or *hesitating*; the fingers placed upon the artery distinguish at each contraction of the heart a trembling pulsation, instead of a single beat. It is not very uncommon to meet with persons in whom it is difficult to determine whether the pulse be redoubled or trembling.

β. The frequency and rareness of the pulse are measured by the number of arterial pulsations in a given time. The pulse is *frequent* (*P. frequens*) when this is greater than in health; when it is less, the pulse is *infrequent* (*P. rarus*) (p. 170). Of all the qualities of the pulse, frequency is alone that which can be measured with rigorous precision by means of the watch. This mode of estimating the frequency of the pulse is very useful to the beginner,

who becomes thus accustomed to value it with precision; but it becomes unnecessary to the experienced physician, who only has recourse to it in those affections, in which it is important to note the slightest alterations in the number of the arterial pulsations from day to day. It has been recommended by some physicians to count the pulse during a whole minute; but a half minute ordinarily suffices, or, what is better, two quarters, the one serving to correct the other. If the frequency of the pulse be extreme, it will be found necessary to count the number of pulsations occurring in five seconds, several times in succession, since the cyphers which represent the low numbers are nearly all monosyllables, and may be pronounced as rapidly as the most frequent pulse, which is not the case with the higher numbers. I have been able, in this way, to count accurately one hundred and sixty, one hundred and eighty, and even two hundred pulsations in the minute; while in attempting to count an entire minute, or even a half minute, it would be found impossible to count above one hundred and fifty. Frequency of the pulse is much more common in disease than its infrequency, the latter rarely occurring except in certain periods of some cerebral affections, in concussion of the brain, and in certain organic lesions of the heart. We recollect a young man at La Charité, suffering from the latter disease, whose pulse did not exceed twenty-eight, and sometimes not even twenty-five pulsations per minute. Finally, we saw with Dr. Menière, a patient in whom the number of the arterial pulsations was not above fourteen per minute, this infrequency lasting for about twelve hours. Frequency of the pulse, on the contrary, occurs in nearly all acute diseases and in a great number of chronic affections. It is almost always accompanied by quickness; sometimes, but rarely, the pulse is frequent without being quick, or quick and at the same time rare; when the pulse beats more than eighty times per minute, it is very difficult to judge of its quickness; this is entirely impossible if the pulsations exceed one hundred and twenty, or even one hundred.

The constant relation which exists, in health, between the frequency of the respiration and that of the pulse, is also generally apparent in disease, being in the proportion of four to one. We are assured by *Giannini* that we can thus by examination of the respiration alone, and without touching the patient, determine the frequency of the pulse in all diseases. This assertion may be generally correct, so far as it relates to other than thoracic affections; but it presents numerous exceptions, particularly in nervous diseases, in which this relation between the circulation and respiration is often deranged.

The pulse is *regular* (*P. regularis*) when the pulsations succeed each other at equal intervals; it is *irregular* (*P. irregularis*), when the pulsations return at unequal intervals. The pulse preserves its regularity in most mild acute diseases; in persons whose pulse is naturally irregular, the arterial pulsations may become regular under the influence of disease. Dehaen observed two

cases of this kind, noticing with anxiety the irregularity which appeared towards the period of convalescence; but the patients themselves, who were aware of the peculiarity of their natural pulse, viewed it as a favorable sign. Irregularity of the pulse may present itself under various forms; sometimes one of the pulsations appears to fail completely, this is the *intermittent* pulse (*P. intermittens*); sometimes, but more rarely, a pulsation occurs in the interval between two regular pulsations; this is called an *intercurrent* pulse (*P. intercidens*). *Intermittence* and *intercurrence* may occur at equal intervals; but the periodicity rarely lasts more than a few minutes, or at most, a few hours. They are ordinarily symptomatic of an organic lesion of the heart; they may appear in neuroses, and in some cases have appeared to be connected with the presence of worms, or the accumulation of gas in the intestinal canal, and the acute abdominal pain which occurs in some intestinal phlegmasiæ; they appear in the last few hours of life in most diseases, and finally, are not unaffected by cerebral influence. A professor of medicine at Bologna, having accidentally remarked an intermittence in his own pulse, became in consequence very anxious; he was constantly placing his fingers upon the artery, and observed at each time that the pulse became more irregular; *Morgagni*, whom he consulted upon the case, advised him to pay no attention to it, and the intermittence soon disappeared.*

Laennec was led, from auscultation, to admit *false intermissions*; in these, the contraction still takes place, but in so rapid and feeble a manner, that no pulsation is felt in the artery; in such cases, there is intermittence of the pulse, and simply inequality in the contractions of the heart.

During intermission of the pulse, the artery is almost always soft and unresisting. Some physicians appear to have observed cases in which the artery was full and tense; Laennec supposed that this kind of intermittence takes place after ventricular contraction, and that while it lasts there is probably a permanent contraction of these organs.

The *equal* pulse (*P. æqualis*), is that in which the pulsations resemble each other in quickness, fullness, and hardness. The pulse is *unequal* (*P. inequalis*), when the pulsations differ from each other in these respects.

The sense that we have attached to the words *unequal* and *irregular*, differs from that given to them by most authors, who have employed these two expressions indifferently. We have thought it better to give to each a precise signification, as was the case in regard to respiration; we have applied the word regularity to the rhythm, and inequality to the other qualities of the pulse.

The pulse may cease to be *distinct* or become *confused*, from extreme frequency, but particularly the feebleness, irregularity, and inequality of the pulsations. There is no degree of frequency in

* *De sed. et Caus. morb.*, Epist. xxiv., art. 20.

which the pulse may not be counted, but, generally, as its frequency increases, it becomes more feeble, irregular, and unequal, so that it is impossible to determine with accuracy the number of pulsations per minute. In this, and in many other cases in which this derangement does not exist to such a degree, an approximate evaluation is alone practicable. The pulse may become *insensible* (*pulsuum defectio*), like that which occurs in the moribund, and sometimes after excessive evacuations in persons who are not otherwise seriously indisposed.

Is the pulse the same, or does it present remarkable differences, in the various arteries in which it may be examined? This question comprises many others which will be successively considered.

The fullness and hardness of the pulse vary with the size of the artery examined; the larger the artery, the stronger is the pulse. Thus in cases in which the arterial pulsations become insensible at the wrist, they are manifest at the bend of the arm, and full and hard in the groins. For the same reason, it may, and frequently does, happen, that the strength of the pulsations differs in the same subject in two corresponding vessels, the two radial arteries, for example. This difference depends upon the unequal size of this artery in the two arms, or the variable depth at which it is seated.

Many physicians have, from certain cases, been led to suppose that, in some cases of congestions, and in certain neurosis, the pulsations in the arteries which are distributed to the affected organ, are stronger than in those of the rest of the body. In most cases, there is supposed to be increased strength in pulsations of such an artery, as the superficial temporal, the strength of which in the healthy condition is not appreciated, and which, in disease, is generally estimated rather from the evidence of the patient than that of the senses of the physician; now, the sensation experienced by the patient may depend upon increased sensibility of the parts surrounding the vessels, as well as the often doubtful increase in the strength of the arterial pulsations.

Do the differences presented in the force of the arterial pulsations in different parts of the body, exist in their quickness, frequency, regularity, or equality?

It is difficult to conceive how the quickness can vary in the different arteries; as, however, there is a difference in the contractility of the various parts of the arterial system, it might not be impossible for the quickness with which the pulsation is effected, to differ slightly in one artery from that of another; but this phenomenon, if it exist, would be difficult to appreciate. The greater frequency of the pulse in an artery, which some authors pretend to have observed, cannot be admitted; in certain local congestions, the pulse may seem to the patient to beat oftener in the inflamed part than elsewhere; but from a knowledge of the laws of the circulation, we cannot admit the existence of any other pulse in the arteries, than that dependent upon the afflux of blood propelled by the contraction of the heart; now, as the whole

arterial system has a common origin in this organ, it is evidently impossible for the pulsations to be more frequent in one artery than another.

It has, however, sometimes happened, that the number of pulsations in a given time was not the same in the two sides; a very remarkable case is related by *Morgagni*. A child who received an injury in the back by a fall from a tree, was attacked with palpitation, which had not disappeared after a lapse of nine years, and which became particularly troublesome at certain periods of the year. *Morgagni* having seen this patient in one of these paroxysms, found upon examination a difference in the pulse of the two sides: "after a careful examination, he found that the arterial pulsations upon the left side were natural in frequency, while, on the right, they were less frequent, in the proportion of three to one." *

This fact, together with others less authentic, seem to be directly opposed to what we have just said; but they only prove that, in some cases, the course of the blood may be temporally intercepted in one artery, without being so in others, and that, owing to the transient obliteration of an artery, intermissions confined to that vessel may occur. The peculiar lesion which produces such an effect, at one time interrupting the course of the blood in a vessel, at another, permitting its flow, has not yet been ascertained by examination after death, the only means of obtaining a satisfactory explanation of this phenomenon.

This differs from those cases in which the pulsations of an artery become gradually enfeebled, and at last entirely insensible, while those of the corresponding vessel preserve their normal condition. This difference, which has been particularly observed in the radial arteries, is generally owing to the development of a tumor in the vicinity of the arterial trunk, compressing it the more as it increases in size, and in some cases completely obliterating its cavity. This is particularly observed in those cases of aortic aneurism, in which the subclavian artery is pressed by the tumor against the bony parietes of the chest.

Such are the principal changes effected by disease in the arterial pulsation; many others have been admitted by authors; Galen described more than thirty.† To these *Solano* of Lucca, and *Bor-*

* De sedibus et Causis, morb., epist. xxiv. art. 33.

† The following are the different varieties of pulse admitted by Galen.

1. *Long*: in which the artery strikes several, or all four fingers.
2. *Short*: in which it strikes but one or two at most.
3. *Large*: in which it is increased in diameter.
4. *Narrow*: in which it is diminished in diameter.
5. *High*: that which seems to raise itself to a point in order to strike the finger.
6. *Low*: that in which the pulsations are hardly perceptible.
7. *Great*: the artery is increased in length, breadth and elevation.
8. *Small*: one whose pulsations are slender and weak.
9. *Quick*.
10. *Slow*.
11. *Frequent*.

due have added still others, and have asserted the existence of a pulse peculiar to the affections or the crises of each organ; but the works of these physicians, in other respects, deserving of merit, are generally considered as ingenious speculations rather than the results of observation. All these minute distinctions of the *ars phygmica* have been justly abandoned.

But it is not only important for the physician to admit no alterations of the pulse but those connected with conditions really appreciable, such as quickness, fullness, hardness and frequency; but it is also necessary that these alterations should not be noted, unless they be very apparent, and such as might easily be recognized by every physician with senses fitted to receive these impres-

12. *Rare*.
13. *Strong*: that which strikes the finger strongly.
14. *Feeble*: that which strikes feebly.
15. *Hard*: the pulp of the finger yields to the pulsation.
16. *Soft*: the pulsation yields to the pressure of the finger.
17. *Full*: the artery, full and resisting.
18. *Empty*: the artery disappears and yields to the fingers; it has no solidity.
19. *Equal*.
20. *Unequal*.
21. *Myurus*: so called when it sinks progressively, becoming smaller and smaller, like a rat's tail ($\mu\upsilon\varsigma$, rat; $\omicron\nu\epsilon\alpha$, tail).
22. *Deficient Myurus*: that which seems every instant about to cease.
23. *Myurus, which diminishes at the two extremities*: that which strikes the first and last finger less sensibly than those between.
24. *Intermittent*: in which the pulsations fail from time to time.
25. *Intercurrent*: in which a superfluous pulsation occasionally seems to occur.
26. *Deficient*: that which ceases altogether.
27. *P. Caprizans*: the pulsation is interrupted in the midst of its diastole, and is afterward finished more rapidly than it was commenced.
28. *P. Dicrotus*: that in which the finger is struck twice at each pulsation, like the hammer on an anvil.
29. *Undulating*: that which resembles in its movements those of the waves.
30. *Vermicular*: the pulsations resemble the progression of a worm.
31. *P. Formicans*: these pulsations resemble the motion of an ant.
32. *Tremulous*.
33. *Palpitating*.
34. *Convulsive*: the artery is tense and hard like a cord.
35. *P. Serrinus*: that which strikes the fingers unequally, like a saw.
36. *Ardent*: that which seems to raise itself to a point, striking the finger promptly and forcibly.

The Chinese physicians, who, it is said, pretend to know the nature and duration of a disease by the examination of the pulse alone, have distinguished still other varieties. They admit a pecking pulse, resembling the stroke of a bird's beak; another, similar to drops of water falling through a chink, or a frog entangled in the grass and seemingly unable to advance or go back; they have also a pulse which they compare to boiling water, and another which is fluttering like a fish continually plunging and afterwards rising so slowly as to enable one to catch it by the tail. (*Recherches Hist. sur la Medec. des Chinois.*) From these comparisons we may judge of the others.

Le P. Leconte remarks that the Chinese physicians before visiting a patient, take care to inform themselves of all that he has experienced; and afterwards having examined the pulse for a long time, without asking any question, they tell with a prophetic air all that they had previously ascertained.

The critical pulses will be enumerated in the article on Crisis.

sions, and capable of discerning them. The pulse is not necessarily feeble or strong, hard or soft, small or full; in many cases it presents none of these characteristics; being, according to the expression of some authors, *moderate*. We would not insist on so trivial a truth, were we not convinced that many physicians have entirely neglected it.

The organs of arterial circulation furnish also other symptoms, dependent upon their dilatation or aneurismal rupture; as the pulsations often felt in an aneurismal sac, or in tumors contiguous to healthy or diseased arteries; also their hæmorrhages which are often fatal, their denudation, wounds, lacerations, and lastly, their ossification, which in old persons is often manifest in the superficial arteries during life.

Auscultation has also been applied to the study of the arterial pulsations, and has furnished phenomena not without interest. In the healthy subject, if the stethoscope be applied over the track of an artery, a peculiar dull sound is heard which is isochronous with the ventricular systole. This sound, which is caused by the impulse of the blood against the walls of the vessel, varies in intensity, according to the size of the artery and the force with which the blood is propelled. This pulsation, this dull sound may, when heard in certain regions where it does not normally exist, reveal to the physician the existence of a very grave disease, the aneurismal dilatation of a vessel. So when a simple or double pulsation, which is circumscribed more or less forcible, and distinct from the pulsations of the heart, is distinguishable upon the anterior and superior part of the chest, or behind, near the vertebral column, aneurism of the aorta may be suspected. The existence of this lesion becomes certain if, at the point where the pulsation is perceptible, there is also an abnormal sound, as the rasping or bellows sounds, and the strength of the pulsation be sufficient to raise the hand.

The bellows sound is, of all the abnormal sounds of the arteries, that most commonly observed. It may be feeble or intense, continuous or intermittent, circumscribed or diffused; it may co-exist in the aorta, carotids, subclavian and crural arteries, the only vessels of the trunk generally ausculted. Sometimes the sound is confined to one or two arteries. In other cases, it is but the resonance or expansion of the same sound produced in the heart, and it is often produced in the vessel where it is audible.

The bellows sound may exist in certain diseases of the arteries, as ossification of their parietes, aneurismal dilatation and varicose aneurism. It may depend upon compression of the vessel caused by a voluminous tumor; as is observed in cases in which the iliac and hypogastric arteries are compressed by an ovarian cyst; but the arterial bellows sound is generally observed in chlorosis, anemia, and after abundant loss of blood, as in uterine hæmorrhage and amputations.

This bellows sound presents itself under various forms, most of which have received distinctive appellations. Thus in chlorosis, a

sound is audible, particularly in the carotids, to which Bouillaud has applied the name *bruit de diable*, from its resemblance to that produced by a child's toy of that name; in other cases, it resembles that of the bellows of a forge; in others, the cooing of a dove; finally, a kind of whistling is sometimes perceptible, which degenerates, in some cases, into a double toned, and slightly monotonous, musical humming. This sound was called by Laennec, who was the first to describe it, a *modulated whistling*, or *music of the arteries*. These last varieties of the bellows sound have, like the others, been principally observed in cases of chlorosis, anemia, and accidentally, in some nervous subjects.

Within a few years many experiments have been tried and described, in order to explain the mechanism of the arterial sounds: When there is dilatation of a vessel, or roughness or unevenness of its surface, or when a communication exists between an artery and vein by a narrow opening, or finally when the calibre of a vessel is diminished by any external pressure, the bellows murmur may be naturally explained by the friction of the blood against the unequal surfaces or contracted parietes of the vessel. But how are these various sounds produced in cases of anemia and chlorosis? This question is unanswerable. It would appear, from recent investigations, that rapidity in the motion of the blood, and particularly the low density of this fluid, are both conditions necessary to the formation of these sounds.*

The symptoms furnished by the circulation in the capillary system and veins, are much less numerous than those observed in the arterial circulation.

C. The florid or livid redness of the skin in the whole or any part of the body, marbled appearance, ecchymoses, paleness and spontaneous hæmorrhages, are all phenomena which belong to the capillary circulation.

Among these phenomena, there are those, such as the florid red color of the skin and active hæmorrhages, which almost always coexist with an evident increase of the vital forces; they have generally been considered as owing to an *increased action* of the capillary vessels. Others, as the marbled appearance, livid spots and passive hæmorrhages, which ordinarily appear in enfeebled persons, are attributed to debility of the same system.

The ecchymoses following contusions, also appear to depend upon the capillary vessels, which are moreover the seat of certain *traumatic hæmorrhages*, in which the blood flows from the surface of a wound. In both these cases, the hæmorrhage is owing to a rupture or section of the capillary vessels, being entirely independent of any increase or diminution in the circulatory force.

It has been thought, by some authors, that the blood may have a retrograde course. The sudden paleness consequent upon a

* Memoire de M. de La Harpe, Archiv. Gener. de Medec., 1838.

lively emotion or sudden impression of cold, is, according to Sprengel,* entirely inexplicable, unless a rapid retrograde motion of the blood in all the arterial and venous vessels, be admitted; but this phenomenon may be explained by supposing that the blood contained in the capillary vessels is suddenly forced into the veins, and that the supply of arterial blood is, at least partially, cut off.

D. The venous circulation presents some very important symptoms. The veins over the whole surface of the body may become distended in certain affections, and particularly in plethora and febrile heat; they disappear, on the contrary, in anemia and in the chill which occurs at the commencement of acute diseases, and in the paroxysms of intermittent fever. Partial dilatation of the veins accompanies various diseases, as local congestions and apoplexy, in which the veins of the neck are often enlarged; it is also observed in the vicinity of cancerous tumors, particularly those of the mammæ; also in cases of compression of the veins of a limb by a tumor: it constitutes one of the most certain signs of deep-seated tumors of the thorax or abdomen; and, in other circumstances, dilatation of the veins of the neck, head, chest and superior extremities, is the only sign indicative of compression of the superior vena cava. We have referred above, to those dilatations of the subcutaneous abdominal veins frequently observed in patients suffering from ascites. There are cases in which their dilatation is considerable, at the same time that the abdominal parietes are indurated; each of these vessels seems, in such cases, to be contained in a solid canal whose angular sides and semicircular floor are perfectly distinguished by the finger. M. Raynaud, who has called attention to the dilatation of the superficial abdominal veins, regards it as indicating the existence of some obstacle to the course of the blood in the vena porta, and as the result of a collateral circulation, by means of which the blood passes from the divisions of the inferior, to the superior, vena cava. The post-mortem examination of those who presented this peculiarity, does not in all cases clearly reveal the impediments to the internal circulation, pointed out by M. Raynaud; but some lesion of the abdominal viscera is always found, generally consisting in an alteration of the liver, known as *cirrhosis*, a species of atrophy in which there is probably some diminution in the diameter of the branches of the vena porta, and a modification of the circulation in some degree corresponding to the opinion of this physician.

In certain parts of the body and particularly in the lower limbs, in which the venous circulation is rendered more difficult by the laws of gravity, superficial, sinuous, knotty tumors of a bluish color are often observed, which momentarily disappear by external pressure and cold, and increase under the opposite conditions. From these symptoms the affection of the veins called varix is at once recognizable, a disease in which the length of these vessels

* SPRENGEL, Pathol. Général, p. 147

increases with their size, as is proved by their sinuosities, a phenomenon not observable in the healthy condition.

The venous blood may pursue a retrograde course, but this can only occur in certain vessels and for a short space. This phenomenon is not uncommonly observed in the external jugular veins, in cases of cardiac aneurism. At each contraction of the heart the reflux of blood can be distinguished by the eye, its diminishing undulations rising often to the upper part of the neck. This symptom is, by authors, termed a *venous pulse*. There is another affection, in which a retrograde flow of the blood in the veins is sometimes noticed; we refer to the *aneurismal varix*. By means of the accidental communication occurring between two contiguous vessels, a portion of the arterial blood passes into the vein, producing in it pulsations isochronous with those of the arteries, and giving to the blood an impulse contrary to its natural course, the influence of which, however, is felt but a few inches.

The manner in which the blood escapes differs in wounds of the arteries, capillaries and veins. In the first case, it issues with force and by interrupted *jets*; in the second, it is effused in small quantities; in the third, it may form a continuous jet, the force and volume of which varies according to several circumstances.

A phenomenon noticed by all authors is the absence of hæmorrhage in certain wounds of the vessels; as in lacerated wounds and those inflicted by fire-arms, and more particularly after the carrying away of a limb by a projectile; but this is by no means always the case, rapid and fatal hæmorrhages having been often observed, particularly in gunshot wounds, if any large artery have been wounded.

E. Having now enumerated the principal symptoms furnished by the circulation, it remains to consider those furnished by the *blood* itself. This subject, so interesting in a scientific point of view, has been almost wholly abandoned since the close of the last century, at which time, *Parmentier* and *Deyeux* published the results of their experiments upon this fluid, and in which the celebrated author of the *Nosographic Philosophique* sapped to its foundations the superannuated doctrine of humorism. Since that time, most physicians, convinced that the blood is insusceptible of any alteration in the living body, have neglected to make any investigations for the purpose of elucidating this important question.

The treatise of these two celebrated chemists, however, from its being opposed to the ancient doctrine, seemed more fitted to attract, than to divert, the attention of the learned upon the subject under discussion; and if it had the contrary effect, the fault is not so much attributable to the work, as to those who lived at the time of its appearance. Its influence can only be appreciated by referring to that period.

Its object was to "determine, from modern chemical discoveries and accurate experiment, the nature of the alterations which the blood undergoes in inflammatory diseases, putrid febrile diseases

and scurvy." The experiments were tried; 1, on the blood of a young man affected with pneumonia; 2, on that of three individuals who presented symptoms of scurvy, connected, in two, with general plethora, and with pain in the side in the other; 3, on the blood of a certain number of individuals suffering from affections vaguely designated by the term *putrid fevers*, in many of which no putridity existed.

Let us suppose for a moment that the results of the observations and experiments made on this small number of patients had all been contrary to the doctrine previously admitted, would they suffice to overthrow it? Certainly not; and we do not hesitate to say, that an opinion which had been held for so many centuries, and had withstood so many contending systems and theories, deserved a more thorough examination before discarding it. This should only be accomplished by a mass of well observed facts. Now, the treatise in which it is undertaken to proscribe it, contains but a single fact, and that favorable to the opinion it combats. The other experiments undertaken in the cases of *scurvy demanding bleeding*, and *putrid febrile diseases*, many of which *did not present this character*, do not afford the necessary conditions to serve as a base for rigorous conclusions.

Let us now pass to the results of these experiments. 1. Chemical analysis showed no difference between the blood in pneumonia and that in scurvy; but, without here referring to the uncertainty inherent in chemical analyses, the results of which vary with the progress of the science, we should recollect that there are many natural, and, particularly, organized, bodies, which are distinct from each other in their physical properties and their action upon the economy, although no such difference is indicated by chemical reagents. This remark, the truth of which is sufficiently evident, should suffice to put us on our guard against the hasty application of chemistry to organized bodies; chemical analysis may show no difference between the blood of scorbutic patients and that of persons suffering from an inflammatory disease, although it may be as great as between wholesome and poisonous substances, which, by chemical examination, are undistinguishable from each other, as the phlegmonous and variolic pus, for example, which is susceptible of producing very different effects upon the economy. 2. In regard to the physical properties of the blood, its consistence and the formation of the buff, *Parmentier* and *Deyeux* observed that they were not constantly the same in similar affections, and were sometimes alike in diseases of an opposite nature. From the careless manner in which the diseases are characterized in this treatise, we should be cautious in regard to the conclusions deduced from these results.

Our only object in thus appearing to criticise this treatise, was to combat the consequences which have arisen from it, and which would, perhaps, be disclaimed by the authors themselves. They justly called in question an opinion the truth of which had not been previously doubted, and are not responsible for errors which they

did not inculcate. We have not maintained an opinion contrary to that which they expressed; we have only proposed to bring the question back to where it should be, and call the attention of faithful observers to a subject too hastily abandoned. Without waiting for new facts to shed more light on this obscure point in pathology, we will consider the less doubtful points respecting it.

We thus expressed ourselves in 1817, and again in 1824, respecting the hitherto contested alterations of the blood in the course of diseases. Since that time there has been an entire change of opinion upon this interesting subject. The fluids of the economy, and particularly the blood, have been the subject of curious researches both by chemists and distinguished physicians, which seem to promise important results.

Some experimenters, and particularly Rossi and Bellingheri, have compared the electrical state of the blood in health and disease; but the result of these researches, which need to be confirmed by others, has, as yet, afforded no useful indication in diagnosis or therapeutics.

The blood, in disease, presents other more apparent changes, which we shall proceed briefly to consider.

While the blood circulates in its vessels, it escapes our observation, and cannot consequently be submitted to examination; it is only when it flows from the body that its physical properties become apparent.

The qualities of the blood can rarely be correctly appreciated in spontaneous hæmorrhages. This fluid, in issuing drop by drop, is coagulated in small masses, so that its color and consistence are alone appreciable; and even these may be with difficulty determined, if, as is often the case, the blood be mixed with other matters. It is only in blood-letting, in which a certain quantity of this fluid flows rapidly from a vessel of medium size, that all its qualities become appreciable. The *force* with which the blood escapes, in the operation of phlebotomy, deserves attention, particularly in its two extremes. Thus, in vigorous subjects, the jet is strong and continuous, while in those suffering from debility, the blood flows slowly, with difficulty and often *guttatim*. In the cold stage of cholera, the slowness with which the blood issues from an incision of the veins, and even arteries, is owing not only to the diminished contraction of the heart, but also to the thickness, viscosity, and almost gelatinous state, of the blood. The *sound* which is supposed to accompany the issue of the blood, and the quantity of froth which appears upon its surface in the cup, it is unimportant to notice. Its *color* can only be distinguished while flowing; its contact with the air, and particularly its separation into different parts, soon produce marked changes in its appearance. It is more red in inflammatory diseases than in adynamic affections and scurvy, in which it is of a blackish hue, and diseases of debility, as chlorosis, anemia and dropsy, in which it is generally pale. Some physicians, *Huxham* among others, assert that they have perceived in the blood at the moment of its escape

from the vein a *fetid* odor in those affected with putrid fever; these assertions require confirmation. Nevertheless, such an odor may possibly have been noticed, if, as has recently been advanced by Dr. Bonnet of Lyons,* the blood in typhoid fever contains hydrosulphate of ammonia, a salt detected by Vauquelin in putrified blood, and it be true that in some cases of anthracoid diseases, a spontaneous development of the hydrosulphuric acid takes place in this fluid.† Pringle also recognized a putrid odor in blood newly drawn.‡ Some authors have asserted that this fluid exhales a urinous odor in retention of the urine, but this opinion has not yet been verified.||

In health, the blood has a saltish taste. It has been supposed, by some authors, that, in diabetes, this peculiarity was less marked, and some have asserted that the serum exhibited a sweetish taste (Dobson). M. Guibourt found, upon examination of diabetic urine, the serum to possess the ordinary flavor.

The temperature of the blood may be modified in certain diseases. Thus in those affected with cholera, it was generally lower by four or five degrees (Reaumur) than in other diseases.

The blood, allowed to remain at rest for a few hours, ordinarily separates into two parts: the *serum*, and the *coagulum*. The proportion, between the coagulum and serum, varies according to different circumstances, some of which only are known. The serum is generally less abundant at the commencement of inflammatory fevers and the phlegmasiæ, sometimes being wholly absent; the blood, in these cases, is said to be *rich*; but towards the latter periods of the disease, the coagulum becomes smaller and the serum more abundant, in proportion to the number of times blood-letting has been performed; sometimes also a portion of the serum remains in the coagulum, which can only be squeezed out by pressure. In these cases, the coagulum is softer than when spontaneously disengaged from all the serum, and if it exhibit a buff, this is thicker from being infiltrated with serum.

The quantity of serum, which is small in robust persons, is considerable in those of feeble constitution, but particularly in those affected with anasarca and chlorosis, and also in those who have submitted to repeated blood-letting: in these cases the blood is said to be *poor*. In the latter, the serum is pale and free from the citrine color which is natural to it; it appears that the soluble salts which it generally contains, are found in less proportion. This has been also observed in Bright's disease; for it results from the experiments of Dr. Christison that, from the first period of this affection, there is a great diminution in the density of the serum, which depends upon a more or less considerable reduction in the proportion of albumen and salts. In consequence of this loss of albumen,

* *Gas. Medic.*, t. v. p. 601.

† *Nouv. Biblioth. Medec.*

‡ *Maladies des Armées*, p. 388.

|| *Maladies des Reins*, t. 1, p. 227.

the serum of the blood is less coagulable by heat,* while an opposite change takes place in the urine.

The serum may also contain various substances which can only be discovered by inspection or chemical analysis. Thus it is sometimes of a reddish color, owing to a portion of the coloring matter of the blood which it contains, a circumstance, according to some authors, indicative of a state of general debility or a cachectic condition. In bilious diseases, particularly jaundice, the serum presents a yellow or greenish tint, which, in some cases, precedes the change in the color of the skin by several days, and indicates the presence, in the blood, of the coloring matters of the bile. According to some chemists, the existence of cholestérine (Boudet) and picromel (Orfila) has been detected in these cases.

The serum sometimes presents a milky appearance, as was observed by Christison in the first period of Bright's disease, and, by Marshall Hall, in the blood which last flowed from animals dying from hæmorrhage. Some physicians were for a long time deceived by this milky appearance of the serum, for they supposed that the blood contained this fluid in substance, or at least, its material principles; but modern chemists are unanimous in attributing this peculiar appearance of the serum to the presence of fatty matters in suspension, which are easily separated by means of ether.

In cases of urinary absorption, and in the first and last periods of the granular disease of the kidneys, the serum contains a considerable quantity of urea (Christison, Rayer, Rees). Some chemists have detected the same substance in the blood in cholera, particularly in cases in which the urinary secretions was suspended (Hermann,† O'Shaughnessy‡). It has been recently advanced by Dr. Copland, that urea is found in great abundance in the blood of persons suffering from gout;§ but this assertion of the English pathologist has not as yet been confirmed.

Many physicians or chemists, among whom we may mention Rollo, Rees, Dobson, M'Gregor, and M. Bouchardat,|| assert that they have discovered in the blood of diabetic patients, a considerable quantity of sugar; but these results were formerly contested by Nicolas and Guedeville,¶ Vauquelin** and Wollaston,†† and more recently by M. M. Henry, Soubeiran‡‡ and Guibourt;||| this question is not yet finally settled.

The coagulum varies in its form, consistence and the peculiar

* *Archiv.*, 3d series, t. iv. p. 472.

† *Bull. des Sc. Med.* de FÉRUSAC, t. xxvii. p. 7.

‡ *Gaz. Medec.*, t. iii. p. 109, 1832.

§ *Dictionary of Prac. Med. art. Blood.*

|| *Revue et Journal des Connaissances Médicales*, 1839.

¶ *Diab. sucré.* Paris, 1803.

** *Journal de Chimie*, t. i.

†† *Phil. Trans.*, 1811.

‡‡ *Journ. de Pharm.*, t. xii. p. 320.

||| RAYER, t. i. p. 244.

appearance of its surface. Its form is generally that of the vessel into which the blood is received, that of a disc flat upon its superior, and convex upon its inferior, surface. In some cases, the superior surface becomes concave from inversion of its edges; the blood is then said to be *cupped*: it is particularly when the coagulum is small that it presents this form, this occurring chiefly in the second period of inflammations and after repeated blood-letting. Much importance has been attached to the consistence of the coagulum. It is generally firm in inflammatory diseases, and in robust subjects; it is, on the contrary, soft in chronic affections, anemia and chlorosis; it is diffuent in cases of miasmatic poisoning, in the last stage of grave fevers, in certain eruptive fevers, and, particularly, in confluent variola, the severest form of scarlatina, &c. The blood, in the cold or blue stage of cholera, is black, viscid, resembling current jelly, and reddening but slowly, by exposure to the air. Increase in the density of the clot, its volume, and the small quantity of serum, indicate an abundance of globules; paleness of the coagulum, denotes a diminution of the coloring principle, and consequently the iron with which it is combined.

Is there a condition of the clot which is characteristic of any disease? Can it be admitted, for example, that a soft and diffuent and curdy coagulum, or a serum holding in suspension a portion of the coloring matter of the blood, are lesions characteristic of typhoid fever? We think not. We cannot indeed regard, as peculiar to typhoid fever, those alterations which often fail, particularly in the first stage of this disease, the only period when blood-letting is generally practicable, and which we have often observed in other diseases.

The surface generally differs in appearance from the rest of the coagulum; it is distinct in color and nature, and of variable thickness. In health and many diseases, this surface is of a rosy or vermilion color in the thickness of a half a line or a line. In inflammations, and particularly those of several days' duration, the blood is almost constantly covered with a crust of a greater or less thickness and solidity, often lardaceous, to which the term *inflammatory crust* or *buff* has been applied (*crusta inflammatoria*). This buff is so frequent in the thoracic phlegmasiæ that, by many authors, it has been called the *pleuritic crust* (*crusta pleuritica*). It also almost constantly exists in rheumatic fever, and very frequently in most acute diseases accompanied with intense fever. The buff does not, however, necessarily indicate the existence of a phlegmasia, since it occurs in the blood of plethoric persons, otherwise healthy, and almost always accompanies pregnancy.

The thickness and firmness of the buff, is generally in proportion to the violence of the inflammation and the robustness of the individual. It is almost always of a greyish white color: it is of a rosy hue when thin, and yellow when the serum in which it floats presents this color. By pressing it, a few drops of serum can generally be squeezed out. The formation and thickness of

the buff do not exclusively depend upon the qualities of the blood; they are in part owing to the manner in which it flows out and the form of the vessel into which it is received. If it flow slowly, it coagulates in falling, as has been before remarked, and forms an homogeneous mass in which neither coagulum, serum nor buff can be distinguished. If it flow in a jet from a narrow opening, the conditions are more favorable, and a buff may be formed; but it is generally thin, and the serum is but imperfectly separated from the coagulum; if the blood flow in a full stream and from a large opening, the separation of the elements of the blood takes place more readily, and the buff which it presents is of a thickness and consistence proportionate to the richness of the blood. These differences often appear at a single bleeding, if the blood be allowed to flow into several cups and with unequal force, as often happens. It is sometimes possible to judge from the different thickness of the buffy coat in various points of its extent, that there has been great inequality in the flow of the blood. Finally, the thickness of the buff varies with that of the clot; that is, the thickness of the layer of blood drawn from the veins, which depends upon the form of the receiving vessel. If, for example, in bleeding a patient, four ounces of blood be drawn into a plate, the buffy coat is only one or two lines in thickness; half of this quantity, received in a tumbler, would present a buff five or six lines in thickness.

There is another circumstance that exerts a marked influence upon the thickness of the buffy coat; we refer to the manner in which the separation between the serum and coagulum is effected. This separation, which is never absolutely entire, so varies, that in some cases, the clot contains twice the quantity of serum as in others. Now, the buff is never so thick as when infiltrated with serum. This disposition is at once apparent from the transparency of the buff, and the facility with which the fluid escapes; if the finger be placed underneath the clot so as to raise it, a multitude of small drops are at once visible on the surface of the buff, which rapidly increase till they unite by their circumferences and flow off. We have sought to ascertain the causes which produce this retention of the serum by the coagulum; but from the different experiments which we have made by varying the form and, in some cases, the temperature of the vessel into which the blood was received, and taking into account the size of the opening in the vein, the force with which the blood flowed out, and the nature of the affection from which the patient suffered, we have been able as yet to learn nothing respecting the conditions necessary to the production of this phenomenon.

The existence of a buffy coat, according to most authors, indicates an increase in the proportion of fibrine; according to others, a modification of the albumen; there are also many who attribute it to a matter spontaneously coagulable. The production of this phenomenon is enveloped in much obscurity.

The blood may contain various deleterious principles, some of which are discoverable by chemical reagents; thus, Orfila has been

able to detect the presence of arsenious acid in the blood of those poisoned by this substance. There are other deleterious principles which can alone be suspected to exist in the blood: thus in the inoculation of the contagious and eruptive diseases, every thing indicates that, between the insertion of the virus and the development of the symptoms, the blood undergoes some alteration, the detection of which is beyond the reach of physical or chemical exploration. The presence of the virus of rubeola in this liquid, would have been shown by the experiments of Fr. Home and Sparanza, who inoculated rubeola with the blood of those affected with this disease, if these experiments had been repeated a sufficient number of times, by different experimenters with the same success, and with all the necessary precautions.

If, as is proved by the observations of modern chemists, the blood in its normal condition contain oxygen, azote and carbonic acid in a free state, it is probable that many alterations in this fluid may depend upon a change in the normal proportion of these gases. Dr. Clanny has pretended that the blood in typhoid fever, contains less carbonic acid, and consequently advises the use of Seltzer water.* But, on the one hand, the opinion of Dr. Clanny upon this alteration of the blood needs confirmation; and, on the other, respecting the curative method proposed by him, we may remark, that having treated a great number of patients, at La Charité, by the exclusive employment of gaseous drinks, no more cures were obtained by these, than by cooling and acidulated drinks.

Such are the principal alterations furnished by the blood in disease; if there be many, which are doubtful, there are others, too evident to admit of question. All physicians are, at the present day, convinced of the necessity of studying these alterations, which are already of interest, and promise henceforth results of immeasurable importance.

The microscopical characters of the blood, both in health and disease, have also been recently investigated. But as no positive results have yet been obtained from these researches, as experimenters have arrived at different and often contradictory conclusions, we abstain from giving opinions which need confirmation. We shall only premise to those engaged in these investigations, that the blood-globules readily undergo an alteration during the formation of the clot, and that hence it becomes necessary to defibrinate the blood as it issues from the vein; in this way a fluid may be obtained, which is easily preserved for a considerable time, and in which the properties of the globules remain unchanged.

§ I. *Circulation of Lymph.* The phenomena which occur in the lymphatic vessels, it is rarely possible to appreciate. The redness which sometimes makes its appearance in their course, and their hard and knotty feel, are symptoms of their inflamma-

* A Lecture upon typhoid fever. Lond. 1828.

tion. Many cases have been cited in which they presented dilations similar to those in varicose veins. But, generally, the alterations of lymphatic vessels are not appreciable till after death.

The lymphatic glands which, with the vessels of the same name, concur in the circulation and elaboration of the lymph, present symptoms more apparent. They often become increased both in volume and sensibility, a phenomenon to which the term *engorgement* has been applied, and which may appear in an acute or chronic form. This engorgement of the lymphatic glands almost always follows a lesion of some part, in greater or less proximity, and more frequently, the application of virus or some acrid substance to the parts from which the lymphatic vessels, belonging to these glands, take their rise. In erysipelas of the face, the submaxillary glands are the seat of a painful swelling, which also occurs in some cases of angina, and particularly those termed *couenneuses*. Chronic eruptions of the scalp, the difficult extraction of a tooth, and dental caries, are frequent causes of a chronic and often circumscribed engorgement of the same glands and those upon the side of the neck. Acute engorgement of the axillary glands, ordinarily arises from an excoriation, a prick of the fingers, particularly if the wound be inoculated with putrid matter, as is too often the case in those who wound themselves in dissecting, or who, having a scratch or excoriation upon the hand, bring it in contact with an irritant and septic fluid, as pus or sanies. In other cases, the glandular engorgement is owing to a phlegmasia, wound, ulcer or blister upon the corresponding side of the chest. In nursing women, diseases of the mammary gland are a frequent cause of a painful engorgement in the axillæ. The glands of the groin, also, become frequently inflamed, and from the precise seat of the engorgement, we may often determine whether it be symptomatic of a lesion of the genital organs, the corresponding limb or the inferior part of the trunk. If it exist in the internal part of the groin, some disease of the genital organs should be at once suspected, because it is in this part of the inguinal region that the lymphatic vessels which arise in the sexual organs, all centre. If the engorgement occur at the inferior and external part of the groin, it generally depends upon a lesion of the lower limb, as a wound or excoriation upon one of the toes, produced by walking or some other cause. If it is the superior lymphatic glands that are inflamed, the cause must be sought in the abdominal parietes. Lastly, if the phlegmasia is confined to the external side of the inguinal region, the corresponding thigh, which is generally the seat of the cause which produces the engorgement, should be examined.

It seems then that inflammation of the lymphatic ganglia generally succeeds an evident cause of irritation, more or less remote. But, there are cases in which the glands become inflamed and painful, independently of any perceptible alteration of texture or color in the neighboring parts. The occurrence of a glandular

engorgement under these circumstances, when accompanied with fever, generally indicates the speedy development of erysipelas upon some not far distant part of the integuments; thus if it be the submaxillary or cervical glands that become affected, the erysipelas will manifest itself upon the head; if the axillary ganglia or those of the groin, its appearance upon the superior or inferior limb may be expected. In those cases where a glandular engorgement precedes the inflammation which it ordinarily accompanies as a secondary phenomenon, it is probable, that, although there be no change perceptible to the eye, or pain experienced by the patient, a modification already exists in the capillaries of the lymphatic or circulatory system, the first effect of which is inflammation of the glands.

When the swelling of the subcutaneous and subaponeurotic glands is very considerable, occupying many at once, and the inflammation of which extends to the surrounding cellular tissue, the inflammatory tumor is called a *bubo*, a word particularly applied to engorgements in the groin and axillary regions, and sometimes to those of the neck and ham. When primary, a rare circumstance, or depending upon a non-specific irritation, more or less remote, they are called *simple*. They are termed *syphilitic* and *pestilential* when caused by the virus which constitutes these two affections: the former, are generally seated in the groin and connected with the existence of chancres upon the external organs of generation; the latter, which are particularly observable in the East, may appear wherever a certain number of glands exist grouped together, as in the groins and axillæ, sometimes in the ham and cervical region, and more rarely in the cheeks; it would appear from the examination of bodies after death, that the deep seated glands, in front of the vertebral column, often participate in the engorgement of the superficial glands.* Syphilitic and pestilential buboes frequently terminate by suppuration. This termination is rare, on the contrary, in *simple* buboes. When chronic engorgement of several glands exists simultaneously in different regions, presenting a chronic form, it denotes some constitutional affection, generally a scrofulous taint.

A peculiar symptom sometimes presented by the lymphatic vessels and glands, is a discharge of colorless fluid, following suppuration or wounds of their tissue, which in some cases persists for a long time, as is occasionally observed after syphilitic inflammation of the inguinal glands.

In regard to the alterations of the lymph, its consistence, acrimony, &c., they have never been definitely determined: analogy would lead us to suppose that this fluid, like all those which enter into the composition of the human body, is susceptible, in disease, of undergoing various modifications; but these modifications have not hitherto been the subject of serious investigation, being a branch of research so entirely new and the difficulties with which

* *De la Peste orientale*, etc., par BULARD. Paris, 1839.

it is surrounded so great, that its elucidation can only be effected by means of experiments performed upon healthy and diseased animals.

SECTION FOURTH.

Symptoms furnished by Animal Heat.

The faculty by which the human body, in the healthy condition, is enabled to maintain a uniform degree of heat, whatever be the temperature of the surrounding medium, becomes still more apparent in disease. In health, the heat of the body is always increased to a certain extent when exposed to a temperature higher than its own ; it becomes diminished under the opposite conditions. In disease, on the contrary, the body may become chilled notwithstanding the employment of warm applications ; the heat may also become burning, without being affected by the ingestion of cool drinks, or the removal of clothing. Under other circumstances, patients become morbidly susceptible of the influence of cold and heat.

The appreciation of morbid heat, as of many other symptoms, requires on the part of the physician long experience, which can only be attained by close observation and the frequent comparison between normal and abnormal heat, in the various conditions of health and disease. The best instrument that can be employed, is the hand. We are sometimes enabled by the thermometer to ascertain the exact degree of the heat of the body ; but this instrument is entirely unfitted to show the other modifications sometimes presented by abnormal heat. In many cases, indeed, we are enabled to perceive a manifest increase of temperature, although that indicated by the thermometer is not above the usual standard of the blood in health. This is particularly evident from the experiments of Hunter, who, having produced an artificial inflammation in the vagina and rectum of an ass, in the chest and abdomen of a dog and slut, was unable, in any of these cases, to distinguish by means of the thermometer the slightest elevation of temperature, whilst its increase was perceptible to the touch.* In order to appreciate the varieties presented by the animal heat, the hand employed should be moderately warm ; it should be applied successively to various parts, and particularly to the extremities of the limbs, face, chest, abdomen, and over the region which appears to be the seat of the disease or predominant symptoms ; it should be allowed to remain in contact with each of these parts, for twelve or fifteen seconds, in order to ascertain if the sensation transmitted to it, remains the same or differs by prolonged contact.

It has been said that the animal heat is, generally, more considerable in children than adults ; that it is always less in the morning, becomes sensibly increased in the middle of the day, and is

* HUNTER (John), *A Treatise on the blood and inflammation*. Lond. 1794, 4to.

more elevated in the evening than at any other period; that during calm sleep, the temperature is diminished by four or five degrees, and at the moment of awaking, is sensibly increased, &c.; but to all these rules established by semeiologists, there are numerous exceptions.

There are four principal modifications presented by the heat in disease, it may be increased, diminished, abolished or perverted.

A. The *heat* may be more or less increased in different diseases, or in different periods of the same disease. Between the slight heat which occurs in many light affections, and the burning heat observed in the most violent febrile diseases, there are various shades.

In some cases, the heat is alone sensible to the patient, in others, it is perceptible to the hand of the physician, or can be measured by means of the thermometer. Some experimenters assert that they have been thus enabled to distinguish an elevation or diminution of temperature of several degrees. Thus in some cases of typhoid fever, the temperature has been known as high as from 33° or 34° c. to 40 or 41° , * while in cholera, according to the experiments made at Vienna, the temperature of the feet was as low as 14° , Ré., and that of the tongue 15° . There is no disease in which the temperature is so low as in cholera. †

The heat may be general or partial; in the first case, it may be distributed equally over the whole body, or, as is most common, be more elevated in certain regions. When the heat is confined to a single region, it is sometimes in the diseased organ itself that it appears, and sometimes in a part more or less remote, as the head, in certain affections of the stomach, and the palms of the hands in some diseases of the lungs. The skin, which covers a phlegmon, is almost always very warm, and the heat of the forehead is often more or less elevated in cephalgia. It has been asserted that the integuments of the abdomen and thorax also become thus affected in the phlegmasiæ of the organs contained in these cavities, as is the case with the skin of the forehead in some cerebral affections; but here the analogy is fallacious. In most diseases, and particularly febrile affections, the degree of heat sensible to the hand, is greater in the regions of the chest and abdomen, than at the extremities: this difference even exists in those cases in which the seat of the disease is remote from these two cavities; and in the phlegmasiæ of the lungs, the integuments of the abdomen are as warm as those of the thorax.

The heat presents analogous varieties, in relation to its type: it sometimes continues uninterruptedly during the whole course of a disease; it sometimes reappears periodically, as in intermittent fevers, or at irregular intervals, being of transient duration in females suffering from disordered menstruation, and nervous

* BOUILLAUD, *Clin. de la Charité*, t. 1, p. 294.

† GAYMARD and GERARDIN, p. 121.

persons; in these cases it comes on in flushes, according to the common expression; these flushes ordinarily occur in the face; they are accompanied by redness of the part, and are frequently followed by gentle perspiration. The partial and transient heat which is sometimes felt in different parts, moving rapidly from one to another, has, by authors, been termed nervous or erratic.

The heat, in disease, presents still other differences in relation to the peculiar character which it offers; it sometimes resembles that of a healthy person when warm: this is called *free* heat; when accompanied by moisture, like that felt by a person after a warm bath, it is called *moist*; if the skin have lost its suppleness and ordinary degree of moisture, the heat is termed *dry*; it is *burning*, when there is dryness together with a high degree of temperature; it is *acrid* and *pungent*, when it conveys to the fingers a disagreeable sensation, well expressed by the epithet, and which instead of diminishing, increases by prolonged contact, and which continues for some time after this has ceased. Some authors have described other varieties, which they have termed *hectic*, and *septic*, heat; but these secondary shades are of difficult and uncertain appreciation, and, as it is impossible to give an idea of them by words, we shall only mention them as belonging, the one to hectic fever, the other, to parts affected with gangrenous inflammation.

B. Diminution of heat, or *cold*, presents the same varieties in relation to its intensity, seat, type, and peculiar character.

Cold may be appreciable by the physician, or be only sensible to the patient, in both cases its intensity may vary. *Coldness* is a simple sensation of cold; *horripilation*, a sensation accompanied with bristling of the hairs over the body (goose flesh); when attended with an involuntary tremor, it is called a *rigor*. A chill may be general or partial, external or internal, transient or continual, with or without exacerbation. Senac speaks of a fever patient whose arm alone was cold. In regard to its peculiar character, it may be stinging, icy, or similar to that experienced by a healthy person when exposed to the cold air.

Partial cold almost always affects the extremities, end of the nose, back and loins. It is also, but very rarely, seated in the affected organ, as is sometimes observed in chronic rheumatism.

A chill of greater or less intensity generally marks the commencement of most of the phlegmasiæ. If violent, and occurring in a person previously in perfect health, it indicates, particularly in the winter and spring, when these diseases are most frequent, an attack of pleuro-pneumonia, and should lead the physician to fear its development, even before the appearance of any other local sign, and when there are considerable disorder of the stomach, or brain, to direct our suspicions elsewhere. This phenomenon alone enabled us, in many cases, to prognosticate an inflammation of the lungs, which did not become distinctly apparent till after one or two days of fever.

Intermittent fever commences also by a rigor; but this is gen-

erally accompanied by a general tremor, which is not commonly observed at the commencement of the phlegmasiæ. When the phlegmasia terminates in suppuration, irregular chills supervene, which proceed from the inflamed organ (Landré-Beauvais). Rigor is often the index of an abundant suppuration, and, according to Baillou, the absorption of pus into the blood.* Dance observed the same phenomenon in phlebitis, when the pus had made its way into the circulatory torrent. In these cases, there are violent chills, which, in some subjects, recur with a kind of periodicity, as in intermittent fever.

In a great number of cases, there is an alternation of cold and heat in the same individual, the chill generally occurring first, followed by the heat; the contrary is sometimes observed. Diminution and increase of temperature often succeed each other many times within a short period.

C. The complete abolition of heat only occurs in cases of freezing which may be partial or general; it is probable that the temperature is nearly as low, even in parts susceptible of complete restoration. However, we know of no fact of this kind in which the degree of heat was measured by the thermometer.

D. The heat is perverted in all cases in which the patient complains of a sensation of cold in a part which is evidently warm, or a sensation of warmth in a part which is cold. The latter phenomenon often occurs in dry gangrene of a limb. The patient complains of burning heat in the affected part, while to the assistants it feels cold. To this disorder of the heat may be referred those sensations of external and icy coldness and internal heat, sometimes simultaneously felt, and *vice versa*. We have seen at La Charité, in one of the wards of *Lerminier*, a case still more extraordinary, that of a young man who had been for some time suffering from intermittent fever. At the moment that he experienced the *rigor*, that is, a sensation of cold with general tremor, his skin became red, warm, and covered with a profuse sweat. This singular phenomenon occurred during several successive paroxysms.

SECTION FIFTH.

Symptoms furnished by the Exhalations and Secretions.

The act by which certain fluids are separated from the blood by means of the various organs, is called *secretion*. Of these, there are two kinds; those that occur in all parts of the body, and particularly on the free surface of different membranes, and are com-

* *Ballo. Consul.*, lib. 1, p. 110.

prised under the term *exhalations* ; and those, which have particular organs, furnished with excretory ducts, and which have been more properly called *secretions*. These will be considered successively.

§ Ist. *Exhalations*.

The exhalations not only serve the purpose of maintaining the suppleness, preventing adhesion, or favoring the motion of the membranous surfaces upon each other ; they act a still more important part in the general equilibrium ; they prepare, by elaboration of the fluids, materials for nutrition. We shall not attempt to follow physiologists in their discussions upon the form and modus operandi of the exhalent organs ; the exhalent fluids, alone appreciable to the senses, are what particularly should claim the attention of the physician.

The symptoms which depend upon the exhalations may be divided into three groups ; to the first, belong the various changes which supervene in the natural exhalations, as those which occur in health ; to the second, may be referred the phenomena peculiar to the morbid exhalations ; we class, in the third series, all that relates to artificial exhalations. To the first series, belong the cutaneous, mucus. serous, synovial, fatty, menstrual, and certain other natural, sanguineous, exhalations ; to the second, the exhalation of blood, pus, and some other fluids ; the exhalation furnished by blistering and cauteries, will be ranked in the third series.

A. *Natural Exhalations*.

1. The *cutaneous exhalation*, or *perspiration*, in health, is constant, gentle, and equal in all parts of the body. It becomes, at intervals, more abundant, constituting sweat, which is always excited by an evident cause, as heat of the atmosphere, exercise, a violent emotion, &c.

In disease, this exhalation may be undisturbed, preserving the suppleness peculiar to the cutaneous surface. When moderately increased, it produces *moisture (mador)* upon the skin. If the increase is more considerable, so that the fluid appears in drops upon the surface of the skin, and moistens the clothes, it is called *sweat (sudor)*. This may be general, or partial ; in the first case, it is everywhere equal, as towards the decline of acute affections ; sometimes it is more abundant on the neck, chest, and forehead, as is observed in phthisis. When partial, it is often confined to the palms of the hands, epigastrium and forehead. Sweating of the hands and feet is habitual in some persons. Its sudden suppression has always been thought to be the cause of severe accidents, as would appear from the observations recently published by Dr. Mondière.*

* *L'Experience*, 1839.

The temperature of the sweat may be mild, elevated or low ; the latter is generally an unfavorable omen.

The sweat presents numerous varieties in relation to its density and color ; it is sometimes thick, viscous and even pitchy as in the dying, and sometimes thin and watery ; it is generally colorless ; in some cases, it imparts to the linen worn a yellow tinge, in others, it has been red (*sueurs de sang*). Cases have been also cited by *Borelli*, *Borrichius* and *Fourcroy*, in which the sweat was of a bluish or black color. The sweat differs in other respects ; it may be slight, moderate, abundant, transient, continual or periodical ; it may be solely the effect of disease, or be excited by particular causes, as a change of position, cough, warm drinks, &c. ; it may relieve or enfeeble the patient, sometimes producing fatal results ; it is, in this case, called *colliquative* (*sudores colliquativi*) ; this may appear at the commencement, towards the middle or decline of diseases, or continue through their whole course. It constitutes the predominant symptom in certain affections ; as in the diaphoretic, pernicious, intermittent fever, so well described by *Torti*, and to which he came near perishing a victim. Abundant sweating is one of the principal symptoms in the *sudor picardicus*, and it was also observed in that terrible epidemic, the *sudor anglicus* or sweating sickness, which in the middle ages ravaged a part of Europe.

The cutaneous transpiration may be diminished or suspended, as is often observed in the first period of acute diseases, in diabetes and dropsy, in which the skin is habitually dry.

However abundant it be, the transpiration may present appreciable changes in its odor, a circumstance which the physician should not omit to notice. The odor of the transpiration is generally a little acid ; sometimes, fetid. It has been compared, in rubeola and scarlatina, to that of *mouldiness* ; it is cadaveric in some adynamic fevers.

M. Landré-Beauvais and Dance* have noticed in cases of mental alienation a peculiar odor of the transpiration with which the furniture and apartments become durably impregnated, whatever be the neatness of the individual. In the miliary sweat, the odor exhaled has been compared by some, to that of chlorine, by others, to that of rotten straw.

The odor of *mice*, supposed by some authors to be one of the symptoms which frequently accompany fevers of bad character and cerebral affections, arises both from the flowing of the urine into the bed of the patient, and the oil cloth placed over the mattress, the emanations of which, developed by the heat and combined with those of the urine, produce this peculiar odor. In some cases, the odor exhaled by the patient is owing to his food and the qualities of the air which he breathes. In persons who eat garlic and onions, the cutaneous exhalation is charged with this odor. We have had at the hospital a groom, who, during the course of an inflammatory bilious fever, continually exhaled a strong odor of

* *Manuel de Semeiotique.*

the *stable*. We satisfied ourselves that all his clothing was removed, and that the odor, which was noticed by all who came near him, proceeded from the patient himself.

In the course of acute febrile diseases and some cases of hectic fever, the abundant sweating may be accompanied by numerous eruptions of vesicles, particularly apparent upon the anterior part of the trunk, about the size of a millet seed and filled with a diaphanous fluid, generally more appreciable to the touch than to the eye, breaking under the finger, and leaving upon the pulp a sensation of moisture: these have been called *sudamina*, from their resemblance to drops of sweat. Of all acute diseases in which this phenomenon is observed, typhoid fever is that in which it most commonly appears, a circumstance not without value in the diagnosis of this disease. Abundant sweating is not necessary to the reproduction of *sudamina*, and it is not uncommon to observe them in persons who have been free from sweating.

2. Disorders of the *mucous exhalation* are more difficult to appreciate, because the membranes from which they take place are inaccessible to view. The alterations, however, which they present at their orifices can be distinguished by the eye, and the examination of the excreted matters, may throw light upon the changes effected in the mucous exhalation in deep-seated organs, as the intestines, bladder, &c.

In health, the mucus, the consistence and quantity of which varies in the different parts of the body where it is exhaled, is furnished in such a proportion as, without being sufficiently abundant to escape, to prevent the adhesion of these membranes, facilitate their movements and the passage and progression of the substances taken into their cavities. Its appearance and composition varies according to the mucous surface from which it is exhaled. Thus that which comes from the neck of the uterus is ordinarily clear, transparent, analogous to albumen, without odor, always alkaline, and, when viewed with the microscope, appearing homogeneous and free from globules (Donné); the vaginal mucus, on the contrary, is thick, creamy, always acid, and never ropy.*

In disease, the mucous exhalation may become increased, diminished, suspended and variously changed. These changes rarely occur simultaneously in all parts of the system. Their successive appearance in all these parts is more frequently observed, as in some catarrhal affections; they are most frequently partial. Increase of the mucus exhaled, is noticed in the second period of catarrh; its diminution is sensible at the commencement of this affection, and in the course of grave fevers; the mucous membrane of the mouth and nasal fossæ, in these diseases, is often very dry.

The mucus may become altered in its qualities; its odor may be nauseous, spermatic, and sometimes acid or fetid; its color becomes green or yellow in chronic discharges; sometimes red in dysentery, black in some grave fevers, or it may be limpid and

* DONNE, *Recherches sur les divers mucus*.

resemble the white of the egg, as in certain cases of bronchorrhœa; in other cases, it may be white and opaque, and it is then often impossible to distinguish it from pus. Its consistence becomes diminished in the pituitary flux, and in serous diarrhœa, and is increased in chronic catarrh; it assumes, in some cases, a flaky, membranous or tubular form, in which it is rejected in shreds. The mucus may be excreted alone, as in coryza, angina, and blennorrhagia; it may be mixed with other substances, as urine, in catarrh of the bladder, fæcal matters, in dysentery, and alimentary substances in vomiting. From whatever surface it comes, it may be mixed with blood or pus; in the latter case, the purulent matters form in the opaque mucus, narrow and irregular streaks still more opaque: this is daily noticed in the second stage of phthisis, and at an advanced period of vesical catarrh occurring in old persons.

Another remarkable alteration presented by the mucus in disease, is the contagious property it acquires in blennorrhagia, and, according to some authors, in many other catarrhal affections: by virtue of this contagious property, it may cause, in a healthy person, the development of an affection similar to that by which it was itself produced.

3. In health, the *serous exhalation* should exist in such proportion, that the membranes and areolæ which it is destined to lubricate, should be always moist, without ever containing fluid. The disorders of this exhalation are difficult to appreciate, because the organs are inaccessible to view, and there is no excretion whereby to judge of the changes which take place.

Does the diminution or suppression of the serous exhalation ever occur during life, as the works of *Marandel* would lead us to suppose? This question, which belongs rather to pathological anatomy than symptomatology, does not seem to us yet decided. We only know that, where two opposite serous surfaces have become adherent, all exhalation is necessarily suspended, or so modified as no longer to belong to this kind of exhalation.

The increase of the serous exhalation is easy to distinguish when it occupies the cellular tissue (p. 76). This is far from being the case when there is an accumulation of this fluid in the serous membranes; it may, however, give rise to phenomena which may lead us to suspect it, when in small quantity, and to be certain of its existence, when in abundance. The distension of the cavity which contains the fluid, the symptoms arising from compression of the neighboring organs, and, in some cases, the fluctuation and the changes in the resonance of the parts, will generally enable us to distinguish the accumulation of serum.

The changes in the color, consistence and nature of the exhaled fluid, are never appreciable during life, unless there be an accidental opening in the parietes of the cavity containing it, or artificial issue be given to it. This change, consequently, belongs to pathological anatomy rather than to symptomatology.

4. The exhalation which occurs in the articular cavities, or in

the synovial bursæ, furnishes few symptoms. The distension of the soft parts, obscure fluctuation, and sometimes, as in the knee, the shock of the articular surfaces, under the pressure of the hand, renders the accumulation of synovia apparent. In some cases also, concretions are found in this fluid, which are entirely free and felt at intervals in different parts of the joint.

5. Increase of the exhalation in the eye produces hydrophthalmia; in the internal ear, it leads to rupture of the tympanum, &c.

6. We have elsewhere referred to the exhalation of fat in its vesicles, and shall not here again recur to it. We shall also pass over certain exhalations which are indicated by no sensible phenomenon, as those which take place upon the internal surface of the blood vessels, lymphatics, &c.

7. To these different kinds of exhalation, that may be added which furnishes the digestive tube with the gases necessary to its functions, and which presents, in disease, modifications more or less remarkable, owing to which the abdomen becomes sometimes very voluminous and resonant, and sometimes flattened, and almost entirely dull on percussion. These variations in the volume and resonance of the abdomen, frequently, rather depend upon some obstacle to the circulation of the gases in these viscera, than to their too abundant secretion; but sometimes, particularly in hysterical females, the sudden changes which the abdomen presents, without the occurrence of any gaseous emission, can only be accounted for by supposing alternations of exhalation and absorption of these gases.

8. Lastly, the sanguineous exhalations, which, in health, periodically make their appearance and concur in maintaining the general equilibrium of the functions, may, in disease, be increased, diminished, suppressed, or only diverted. The menstrual exhalation frequently presents these various phenomena in the diseases of females, and analogous disorders have been many times observed in men accustomed to the hæmorrhoidal flux or epistaxis, &c.

But if there are some normal hæmorrhages which are connected with health, and form a part of its attributes, there are many more which only appear under the influence of disease and, in some cases, alone suffice to constitute it.

B. *Morbid Exhalations.*

At the head of morbid exhalations, may be mentioned those of the blood, or *hæmorrhages*,* and of pus, or *pyogenia*.†

1. Hæmorrhages consist in the escape of blood from the vessels destined to contain it: this flow is sometimes owing to the action of a wounding instrument, which, by dividing the vessels in which the blood circulates, furnishes the natural explanation of the accident produced. But, in many cases, the flow of the blood from

* *Αἷμα*, blood; *ρεω*, I run.

† *Πυρ*, pus; *γίνομαι*, I am generated.

these canals, occurs independently of any external cause; the hæmorrhage takes place, as it were, spontaneously, and is hence called *spontaneous*, in opposition to the preceding, which is called *traumatic*. Among the hæmorrhages, called spontaneous, some are connected with a material lesion of the part from which the blood proceeds, as tubercles, cancer, &c; these are termed symptomatic. Others, epistaxis, for example, occur, without the existence of any lesion discoverable during life or by examination after death, to account for such a phenomenon: these have been called *essential*, as, being symptomatic of no appreciable affection, they themselves, in the present state of the science, represent the disease. These essential hæmorrhages are by no means the most common; if we except epistaxis and the hæmorrhoidal flux, which often relieve the wants of the constitution, and which, like the menstrual flow, contribute to health, they are, as we shall see in the chapter on diagnosis, in most cases, symptomatic; they are sometimes owing to a lesion of the organ from which the blood flows, and of which they constitute the first sign; and sometimes to a general affection of the economy, the blood, in these cases, often flowing from different parts, as in scurvy and some pestilential diseases. Spontaneous hæmorrhages generally occur from the mucons membranes, rarely from old cicatrices or any other point of the cutaneous surface; they sometimes appear in the cellular tissue, where they form spots and ecchymoses, to which we have referred above. The blood may be also exhaled into the serous and synovial membranes, into the parenchyma of the viscera, muscles, &c.; but, in such cases, the hæmorrhage is often manifested by no certain sign. The blood which flows from the body, presents varieties in its color, which may be florid red or livid, in its consistence, which may be soft or firm, in its quantity, which may vary from a few drops to several pounds, and in the substances with which it may be mixed. Hæmorrhages differ also in respect to the period of the disease in which they occur, and the influence they exert upon its progress and termination: they have hence been distinguished into those that are favorable, prejudicial, or indifferent.

2. *Pyogenia*. The opinions of physicians upon the formation of pus, have been very various: some, have pretended, with *Dehaen*, that it is formed in the arterial system, to be exhaled in the inflamed part; others, that it can only be produced where it is found to exist. Among the latter, some have regarded pus as proceeding from the broken down parts where the suppuration is taking place: others have considered it the result of a chemical combination between the various fluids of the affected part, and particularly between the lymph and fat. These two opinions, the first of which has been for a long time favored in the schools, and the second of which has but few followers, are now generally abandoned, and pus is now considered as the result of a morbid exhalation from the same organs which produce the natural exhalations.

A very remarkable phenomenon in the exhalation of pus, is,

that it does not present the appearance and consistence peculiar to it, till after it has remained for a certain length of time upon the organ which furnishes it. *Van Swieten* remarked that when the fluid furnished by a wound was hourly removed with a sponge, the fluid thus obtained was not purulent, but a thin and turbid serum.

All the tissues are not equally disposed to the formation of pus; but there is none, with, perhaps, the exception of the tendons, cartilages and aponeurosis, in which inflammation may not produce suppuration. Inflammation does not always produce pus, but it is generally supposed that the latter is never formed unless there have been previous inflammation, either in the part where the pus exists, or at a greater or less distance from it; in the latter case, the pus may have reached the point it occupies in obedience to the laws of gravity (*abscess by congestion*), or have been displaced by the exhalent vessels after having been absorbed in a more or less remote part of the economy (*metastatic abscesses*). See METASTASIS.

The displacement of the pus in abscesses by congestion, is a phenomenon which has long been known, and upon the production of which there has been little diversity of opinion. Pus formed slowly at some elevated part of the body, without being circumscribed by previous acute inflammation, may find its way down between the meshes of the cellular tissue, and collect at the lowest point, in the loins, for example, or in the superior part of the thighs, and form a fluctuating tumor at some distance from the place where it was produced. In regard to metastatic abscesses, they have been of late particularly studied, but their history still presents some obscure points. They have been frequently observed in variola, in the period of desquamation: they appear, in these cases, as brownish, fluctuating tumors, very tender on pressure, being formed and discharging themselves with great rapidity, in a few days or hours, and from which flows a reddish or sanious pus: this fluid, which is doubtless absorbed from the variolic pustules, finds its way to the skin, being very rarely deposited in the internal parts. It is far otherwise with the abscesses which follow wounds, surgical operations, parturition, between which and the two first conditions there exists some analogy, and phlebitis produced by venesection. In these cases, rigors and ataxic symptoms supervene, followed by the appearance of indolent fluctuating tumors in different parts of the body, and sometimes in the substance of the muscles, varying in size from that of a nut to that of a pullet's egg. In some cases, one or more articulations present swelling and fluctuation, with or without pain. Examination after death, reveals the existence of pus at all these points, and often numerous internal abscesses, scattered through those viscera which are the most vascular, as the lungs, liver and spleen; more rarely the brain and kidneys; and, in many cases, there are evident traces of inflammation in some part of the venous system. This assemblage of phenomena, has led all physicians to regard these abscesses as produced by the passage of pus into the blood,

whether the pus formed in the veins be thus carried throughout the circulatory system, or be introduced into it by means of lymphatic or venous absorption. But in the attempts to explain the formation of these abscesses, there has not been the same unanimity of opinion; some have supposed them to be merely depositions of pus which has been absorbed; others have considered that the blood, altered by its mixture with pus, becomes, in various parts of the economy, the material cause of a suppurative inflammation. Neither of these opinions is wholly admissible; the former, because these abscesses are formed not only in open cavities, as the meshes of the cellular tissue and synovial membranes, but in the parenchyma of the lungs, liver, spleen, brain, kidneys and muscles, in which a cavity cannot be formed except by means of an inflammatory process; it may be added that the abundance of pus found in metastatic abscesses, is often disproportionate to the extent of surface where the pus was first formed, and finally, that the pus deposited in an organ, itself becomes an agent of suppuration; that the pus, as has been said, produces pus. In regard to the second opinion, the alteration of the blood by pus, it does not account for the rapidity with which these collections form in the subcutaneous cellular tissue, often without the existence of pain. It might also be asked, how a general cause can produce circumscribed, though multiple, results. It may then be admitted, from observation, that the pus carried into the circulation, is deposited in various quantities, in different parts of the economy, so as indirectly to form, in one part, an abscess, and in another, become the material cause of a suppurative inflammation. In regard to the causes, by virtue of which, pus that has been absorbed, is deposited in some parts rather than others, and in various quantities, they are in the present state of the science entirely unknown: the artificial irritations established by the physician upon the skin, by means of topical rubefaciants or vesicants, are not here called purulent collections, and seem to have no influence upon the unequal and inexplicable distribution of this deleterious fluid in the various parts of the body.

The softening of tubercles is a phenomenon which appears opposed to the opinion above expressed, viz., that the presence of pus is a sign of previous inflammation. A body, to all appearance unorganized, is formed in the tissue of the lungs or some other organ; it acquires a certain size, and is then found to present an opaque color, moderate hardness and great friability. At the end of a certain time it becomes softened sometimes throughout its whole extent, sometimes at its centre, and is converted into a matter analogous to the pus exhaled by an inflamed organ; but simultaneously with the occurrence of this change, redness, swelling and heat supervene in the surrounding parts, as in the case of subcutaneous tubercles; and hence it is natural to suppose that the inflammation of the neighboring parts is not foreign to the transformation of the tuberculous matter into pus.

The pus exhaled upon the surface of the skin, or external

wounds, escapes freely. That formed internally sometimes extends throughout the tissue of an organ, as is observed in the lungs, and sometimes forms one or more collections termed *abscesses*. The pus collected into an abscess ordinarily finds its way towards the integuments or the canals through which it may be discharged from the body, by the gradual absorption of the intervening parts. Pus which extends throughout the tissue of an organ cannot be evacuated in this way, and absorption is the only means by which it can be removed. This absorption is manifest in some subcutaneous abscesses, particularly in buboes; such inflammatory tumors after being soft and fluctuating, in a few days, and even a few hours, may gradually flatten, and the fluctuation disappear.

Pus, considered in itself, presents varieties relative to its physical and chemical properties, and its action upon the animal economy.

Its quantity is relative to the extent of the suppurating surface, the period of the disease and many other circumstances. It may be diminished by errors in diet, violent mental emotions, a febrile recrudescence which should always lead us to fear a complication or purulent absorption, or any other supervening evacuation. *Huller* observed that the exhalation of this fluid was generally more abundant in the night than during the day.

The color of pus is ordinarily yellowish white, or greenish; it is sometimes reddish or livid; it has been noticed to be bright yellow in persons affected with jaundice. Its color is sometimes uniform throughout, sometimes diversified; in some cases it is thick, homogeneous, and its globules, when examined with the microscope, very abundant; this is called *laudable* or *healthy* pus; it is observed in cases of healthy inflammation running a rapid course, and occurring in persons of good constitution. In other cases, it is clear and mixed with opaque flocculi; it sometimes resembles badly clarified whey, as is observed in chronic abscesses which occur in scrofulous persons and those of bad constitution. Sometimes serous or sanious pus becomes of a brownish color by the contact of the air; it blackens silver and lead instruments with which it comes in contact; this has been attributed to the sulphuretted hydrogen gas contained in it. Some abscesses of the liver furnish a thick, reddish matter, resembling the lees of wine, which deposits, on standing, portions of the substance of the liver. Surgeons, and Boyer in particular, did not admit that any other than that presenting these conditions, proceeds from the liver, but it is now proved that a phlegmonous pus has been found to exist in this viscus, several examples of which have been published by M. Louis, as occurring at La Charité and observed by us together.

The odor of pus is ordinarily nauseous, sometimes characterized by a penetrating, nauseous or insupportable fetor. It has been long observed by surgeons that pus contained in an abscess of the abdominal parietes, or at the margin of the anus, often exhales the most fetid odor, analogous to that of the fæcal matters, so as to lead to the suspicion of a communication between the abscess and intestines. Abscesses of the mouth and pharynx also yield a

very fetid pus. Every one is familiar with the repulsive odor that pus acquires in abscesses of the labia majora in females, and in urinal abscesses of both sexes. This fetor is not generally apparent at the time the abscess is opened, except in those cases in which it exists at the surface of the skin, or in the neighborhood of organs which contain air. It may acquire this odor after the abscess is opened, if air be admitted into the cavity. The taste of pus, according to *Schevilgué*, is nauseous and sometimes acrid: its specific gravity is greater than that of distilled water. The same causes which influence its quantity ordinarily modify its other physical qualities, and particularly its consistence and color. The chemical properties of pus, being of no practical value, we shall not here consider.

The action of pus upon the economy deserves particular attention; this varies according to the tissues. Upon the skin, pus causes only redness and excoriation; in the cellular tissue, through which it flows, it excites the formation of new pus; in the vicinity of bones, it *wears them away* by exciting in their tissue interstitial absorption. If it exist in circumscribed abscess, and come in contact with the air, it soon acquires a strong odor, loses its homogeneity, and produces general functional disturbance and death. The same phenomenon occurs whenever the pus, without being altered, is accumulated in one of the splanchnic cavities, or one of the viscera important to life. We have above referred to the metastatic phenomena which may result from its absorption. Finally, this fluid may, in some diseases, become the vehicle of contagion, as is observed in variola, syphilis and glanders.

The distinction between mucus and pus is one of the points which most occupied the attention of physicians of the last century. They supposed that pus was constantly the result of a solution of continuity, and never owing to simple exhalation; in order to retain the name of pus for certain fluids which presented all its characteristics, they were also obliged to suppose ulcerations where they did not exist; they supposed their existence in the urethra and uterus when affected with catarrh. The chemical experiments, which have been made, in order to determine the true characteristics of pus, have terminated in nothing satisfactory. The results of microscopical researches, have been equally unsuccessful. It was thought for a long time that when globules, similar to those observed in the blood, were noticed in the secretion of a mucous membrane, they indicated the presence of pus. But it is now proved that mucus varies much in its physical and chemical composition, and that it often contains globules, which, in their form and volume, resemble those of pus. Chemical reagents and the microscope are useless when the appearances presented by pus and mucus are distinct; they are also insufficient, when these two fluids resemble each other.

3. There are still other essentially morbid exhalations which need only to be enumerated; such are those occurring between the reticular tissue of the skin and epidermis, in pemphigus and all

the vesicular and pustular eruptions. These fluids, in coagulating and hardening by exposure to the air, form, upon the surface of the skin, peculiar concretions, to which the term *crusts* or *scabs* has been applied. Their study is not without importance in cutaneous pathology; for by considering their form, surface, degree of prominence or depression, color, hardness, degree of adherence, etc., we are enabled to determine the kind of cutaneous disease without having seen it in its elementary form. It is thus that *porrigo favosa* is distinguished, its crusts being yellowish and presenting a cuplike depression; these crusts are yellow, thick and friable in impetigo; they are very adherent, thick, blackish and elevated in the centre, in ecthyma; while in vesicular and bulbous affections, they are thin, easily detached, and of a yellowish or brownish color.

The skin may be also the seat of another morbid exhalation, to which the term *squamous* has been applied, and which is characterized by the formation, upon the diseased surface, of an inorganic, lamellar substance of a grayish white color, dry, friable, more or less thick and adherent, and which is regarded as a morbid secretion of the epidermis. Scales are observed in lepra, psoriasis, pityriasis and ichthyosis.

C. Artificial Exhalations.

Artificial exhalations are, in relation to symptomatology, of less importance than all others. It may, however, be well for the physician to know the quantity and quality of the pus furnished by cauterization, vesication, moxas and setons; the aspect of the exhalant surface also deserves special attention.

In diseases, in which the strength is maintained, the pus of artificial ulcers is in a certain quantity, of a proper consistence, homogeneous, and its odor is not repulsive; the surface from which it proceeds is of a rosy or red color, and acutely sensitive without being morbidly so. In diseases which tend to a fatal termination, the pus is almost always serous or of unequal consistence, it is sometimes mixed with blood and often emits a very fetid odor; the exhalant surface is pale or livid, sometimes ecchymozed or black; it is sometimes insensible, and sometimes the least touch excites in it severe pain. When artificial ulcers exist before the disease, it often happens that they become dry a few days previous to its development, or the matter exhaled may present remarkable changes.

§ II. Secretions properly so called.

In health, the secretions concur, together with the exhalations, in maintaining the general equilibrium; the first increasing when the second diminish, and *vice versa*. In disease, this order, sometimes preserved, is often interrupted, and cases occur where both are simultaneously increased or diminished. In the cases of hectic

fever that fell under the observation of *Cotugno* at Naples, there were, at the same time, continual perspiration, laxity of the bowels, and a copious flow of urine. In the first and second stage of many acute diseases, the secretions and exhalations are simultaneously suspended; the skin is dry, the abdomen contracted, and the urine is excreted in small quantities.

Independently, however, of this general disturbance, the particular secretions are subject to changes, which we proceed to enumerate.

1. The *tears* in health are secreted in such proportion, that while the eyes and eyelids are constantly moistened, none of the fluid flows out over the cheeks. Under certain circumstances, as, the existence of vivid mental emotions, the exposure of the face to cold winds, etc., the tears are secreted in greater abundance, filling the eyes, and even escaping upon the face. In disease, the secretion of the tears is seldom diminished; it is increased, in the first stage of eruptive fevers, particularly rubeola, in the decline of the paroxysm in hysteria, and in some forms of monomania. The tears are also more abundant in many diseases of the eyes, and particularly ophthalmia. During the existence of *tic douloureux* in the ophthalmic branch of the fifth pair, the secretion of the tears is increased, and they often produce a sensation of warmth or burning in the parts with which they come in contact.* In some cases, the tears appears to be altered in their nature, becoming more acrid, to judge from the effect which they produce upon the skin of the face, over which their passage is indicated by redness and excoriation.

The fluid secreted by the follicles of *Meibomius* sometimes forms a kind of gummy concretion, (*chassie*), which has the effect of producing adhesion of the eyelashes and consequently the free edges of the eyelids. This alteration of the secretion occurs in most cases of ophthalmia, particularly the ophthalmia of children, and in the inflammation of the eyelids such as results from an extension of erysipelas of the face. Lastly, the eyes often become thus affected at the close of acute diseases which terminate unfavorably.

2. The secretion of the saliva in health is abundant during meals, but diminishes, and its excretion almost entirely ceases, in the intervals, unless excited by the imagination, or by mastication, etc. In disease, the secretion of the saliva is sometimes increased to a considerable degree, either in consequence of the disease itself, or the remedies employed for its cure, as the different mercurial preparations. This increase is termed *salivation* or *ptyalism*† (*salivatio*, *ptyalismus*), and is generally accompanied by swelling of the gums, cheeks, tongue, and more rarely, the parotid region.

* The flow of tears over the cheeks does not always indicate an increased secretion. The inertia of the puncta and lachrymal canals, the eversion of the lower eyelid, the obstruction of the lachrymal sac or nasal canal, and certain diseases of the eyelids, may also produce *epiphora*.

† *Πτυαλισμός*, from *πτύω*, I spit.

Salivation has been attributed to an increased secretion in the salivary glands (parotid, submaxillary, sublingual) produced by the elective action of mercury upon these glands; but more exact observation having proved the existence of considerable swelling of the mucous membrane of the mouth, unaccompanied often by any swelling of the salivary glands, we should refer the increased secretion of which the mouth is the seat, chiefly to its lining membrane, and the numerous follicles with which its surface is covered, according but a secondary influence, in the phenomenon of salivation, to the salivary glands, properly so called. The salivary secretion is also increased in inflammations of the throat, in cases of apthæ, ulcerations and glossitis, and during dentition which, according to most authors, it facilitates. Sydenham laid great stress on ptyalism occurring in variola of adults, commencing generally with the eruption and terminating towards the twelfth day. Its termination before this period, he considered an unfavorable omen. If we consider, however, that this salivation is often owing to an eruption of variolic pustules in the mouth, we shall attach less importance to the phenomenon pointed out by Sydenham.

The secretion of saliva is diminished in most acute diseases, in which the mouth is constantly dry. It appears to undergo a change in many cases of neurosis, in which it becomes acrid and burning; in some diseases of the bladder, in which it has a urinous taste; and in hydrophobia, in which it seems to acquire contagious properties. Its excretion becomes difficult or impossible in cases of obstruction or obliteration of the excretory ducts. It may escape externally in cases of wounds or fistula of the ducts or glands themselves.

The principal chemical modification which the saliva undergoes is the passage from an alkaline to an acid state. This acidity has been observed by M. Donné, to accompany, most generally, an irritated or inflammatory state of the stomach, either primary or secondary, and he thought might serve to establish the diagnosis of some gastric affections. But the researches of other physicians on this point have not confirmed the results published by M. Donné, and renewed examination will be necessary to remove this uncertainty. The permanent acidity of the saliva seems, as some authors have remarked, to exert an influence on the development of dental caries. Lastly, the acidity of the saliva is one of the most common causes of acidity of the breath, which has been before considered (page 137), and which deserves the particular attention of the physician.

3. The secretion and excretion after bile, occur in health without any apparent phenomenon, the situation of the biliary organs not permitting us to observe the changes they may present. It is nearly the same in cases of disease; necropsies frequently bring to light lesions in this fluid itself, and in the disposition of its excretory ducts, which had not been suspected in life. Even at the present day, we have but a very imperfect knowledge of the dif-

ferent modifications which health and disease may effect in the composition of the bile. In fact, if we consult all the works on pathology published since the time of Galen, and particularly during the last two or three centuries, we shall find that the physicians of this long period, have described a multitude of changes in the bile, by the aid of which they have explained the nature of many diseases and the forms under which they are presented; but this doctrine, connected with the humoral ideas then entertained, was supported by no positive proof.

The bile in its normal state, is liquid, of a yellow or greenish color, viscous, ropy, bitter and slightly alkaline. It may present different degrees of consistence or color, without our being able to determine how far these modifications are consistent with health. The bile is often changed, either in quantity or quality, in many diseases of which the biliary apparatus is not the principal seat; while in many deep-seated, though partial affections of the liver, as cancer and abscess, the bile undergoes apparently no remarkable change, this organ preserving its normal texture in those portions of its parenchyma which lie between the cancerous parts, or the purulent collections.

M. Louis has satisfactorily established that alterations in the bile and the gall-bladder are much more frequent in the course of the typhoid affection, than in the other acute diseases; and that of all the chronic affections, pulmonary phthisis is that in which the bile most frequently undergoes change, in such cases, closely resembling treacle. M. Andral has noticed in the same affection, that the bile is sometimes replaced by a fatty fluid. In atrophy of the liver, and especially in cirrhosis, the bile generally exists in small quantity and is sometimes almost colorless and albuminous. M. Hermann, of Moscow, is confident that in Asiatic cholera the bile contains a very large proportion of resinous matter. This fluid may acquire irritating and even poisonous properties, as has been proved by the experiments of Deidier* on the bile of persons affected with the plague at Marseilles in 1720, and by Vicq d'Azir, † in an epizooty which he observed in 1778. We are still entirely ignorant whether an alteration in the bile is connected in any way with those diseases of warm countries, described under the name of bilious fevers, or with certain sporadic cholas. English physicians are of opinion that a great number of the derangements of the digestive organs, are connected with some change in the composition of the bile; but nothing is with certainty known upon this subject.

A greater part of the alterations in the bile of which we have just spoken, have only been verified after death by examination of the fluid collected in the gall-bladder; they consequently belong to pathological anatomy, rather than to symptomatology. Nevertheless, we have thought it best to enumerate in this connection

* *Expér. sur la Bile*, Zurich, 1722.

† *Moyens Cur. Contre les Malad., Pestil.* p 94.

the changes noticed in autopsies in the composition of the bile, in order to direct the attention of observers to the examination of the fluid excreted, either by vomiting, or by stools, in the course of diseases. We should hope that accurate observations of the bile, especially when vomited in an almost pure state and in considerable quantities, will furnish interesting results, and throw much light, in many cases, on diagnosis. We are equally persuaded that the chemical analysis of bilious stools and other stercoral matters, will one day furnish signs of great value in the diagnosis of diseases of the liver, the intestines and all the other digestive organs.

The only changes hitherto noticed in the biliary secretion and excretion, have reference either to its increase in bilious flux, or to its suppression in cases of jaundice arising from occlusion of the excretory ducts by calculi contained within them, or by the compression of a tumor. Whenever any cause obstructs the excretion of the bile, the alvine matter loses its natural color, and becomes of a grayish tint; while the fluids excreted, and particularly the urine, assume the color of the bile, which also diffuses itself over the whole skin, and exists to a considerable extent in all the solids. Chemical analysis discovers in the urine, in the serum of the blood, and in most of the humors of these subjects, some of the materials that enter into the composition of the bile, such as the coloring matter and perhaps the picromel. The yellow color, so remarkable after death in all parts of the body, proves also, that all the organs, cartilages, tendons and even bones, participate in the general impregnation.

4. But however obscure the changes that take place in the secretion of the bile, those that disease produces in the secretion of the *pancreatic fluid* are still more so. Is there any increase of this secretion in certain aqueous fluxes of the intestines, in serous diarrhœa, for example? Does the pyalism that takes place in certain abdominal affections indicate, as has been asserted, that the secretion of the pancreatic fluid is diminished or suppressed? May not the formation of calculi in the pancreatic duct, give rise to accidents analogous to those observed in hepatic and nephritic colics? In the present state of the science it is impossible to answer these questions.

5. The secretion of the urine is one of the most important, both on account of its quantity and because its changes are readily appreciated. In health, the quantity of the urine is about the same every day, though its increase or diminution depends upon the abundance of the other excretions, upon the quantity of food and drink, and upon changes of temperature. At the time of its excretion, the urine is warm, transparent, of a pale yellow color, and slightly acid. It has an odor peculiar to itself unaccompanied with fetidness. It is salt and bitter to the taste, and has a specific gravity of 1.018. It often becomes turbid upon cooling, recovering its transparency after its floating particles are precipitated. After two or three days it becomes ammoniacal and fetid.

The urine of the healthy man presents numerous changes in its physical and chemical properties, according as it is secreted before, during, or after, meals, and particularly according to the quantity and nature of the food and drinks. Certain substances change, in a remarkable manner, its color and its odor; it becomes blackish after the simultaneous use of rhubarb and iron, cassia and the chalybeates; sorrel broth, and the root of the strawberry and madder, change its color to red; turpentine gives it the smell of the violet, and asparagus, an intolerable fetor.

In disease, the excretion of this urine and this fluid itself undergo important changes.

The excretion of the urine may be attended with pain, as in blennorrhagia; *dysuria** is where it is attended with difficulty, as in the contraction of the canal of the urethra; *strangury* (*stranguria*)† where it flows *guttatim*, a symptom which frequently accompanies vesical catarrh; *ischuria*‡ or the retention of the urine, is where its excretion is impossible; and *vesical tenesmus*, where there is a continual and painful desire to make water, and where the urine is excreted in small quantities at a time and with a sensation of burning. The excretion sometimes occurs involuntarily, as in certain spasmodic affections of the bladder, in which it takes place at the moment of the desire, and in spite of the efforts of the patient to prevent it. In other cases in which the excretion of the urine is involuntary, the patient is unconscious of it, as in many diseases accompanied with delirium. There are other cases in which, instead of being excreted at certain intervals and in a certain quantity, the urine flows drop by drop without interruption; this is called *incontinence of urine*. Ordinarily, the urine is only excreted in this manner when the bladder has acquired all the distension of which it is capable, and its excretion is then said to take place by *regorgement*. In another class of cases the urine flows interruptedly in jets, and its excretions ceases and recommences many times before being complete; this symptom often arises from the presence of calculi or clots of blood in the bladder, which at intervals obstruct the neck of this viscus; it is also of frequent occurrence in certain spasmodic affections. The excretion of the urine is also subject, in disease, to deviations. We have known it in *perviousness of the urachus*, to escape at the navel, and, in the different forms of vesical or urethral perforation, to find its way out through the anus, the scrotum and the neighboring parts, and the vulva. Some authors have mentioned still more remarkable deviations of the urine, such as urinous salivation, perspiration and vomiting. Boerhaave thought he even discovered urine in the cerebral ventricles. These last statements, however, can hardly be received with implicit confidence. It may be that the fluids of which these authors speak, have had the urinous odor and color, but we may

* *Δυσουρία*; δυσ, with difficulty; οὔρον, urine.

† *Στραγγουρία*; στραγγί, drop; οὔρον, urine.

‡ *Ἰσχω*, I retain; οὔρον, urine.

well doubt whether this phenomenon is owing to the actual presence of urine.

The urine, considered in itself, presents numerous changes in sickness. These changes relate to its quantity and its physical and chemical properties. The *quantity* of the urine increases sometimes in the decline of diseases. It is unusually great in diabetes, and diminishes in dropsy. Entire suppression of the urine never takes place, except in cases of occlusion of both the ureters simultaneously, or of one only; and in cases in which, either owing to congenital formation, or to complete atrophy of one of these organs, but one kidney exists.* In a greater part of the nervous affections, the urine is *colorless*, less acid and often neutral. It is generally red and unusually acid at the commencement of acute diseases, and brown, or black, in many fatal diseases. The latter color generally arises from the coloring matters of the blood contained in the urine. It may also be owing, according to some chemists, to the accidental presence in the urine, of a peculiar acid, called *melanic*. Lastly, the urine may become milky white in cases in which it contains either pus, or a fatty substance, that can easily be separated. But whatever its color, the urine may be transparent or turbid. The urine is said to be transparent when it preserves its translucency, or recovers it after momentarily losing it in cooling. Turbid urine is that which remains so, and does not become transparent by the precipitation of the particles suspended in it. Opacity of the urine is caused by the presence of mucus, blood, albumen, pus, etc., but more generally by an excess of uric acid, urate of ammonia, or of the alkaline phosphates. The ancients termed the urine *jumentense*† when it is turbid and contains at the same time corpuscles or opaque particles floating in it. This expression, however, though much used by old writers, has no very definite meaning, and may be applied to urine differing very much in chemical properties. The smell of the urine becomes ammoniacal in chronic catarrh of the bladder. In certain adynamic diseases, and in many vesical affections it emits a brackish smell. The discolored urine excreted during the declension of hysterical attacks, and in the first stage of intermittent fevers in almost inodorous. In inflammatory diseases, on the contrary, it emits a very powerful odor. In diabetes mellitus the urine acquires after fermentation an alcoholic smell. In Bright's disease, it has sometimes the smell of boiled beef. This latter smell is occasionally perceived in the urine of healthy persons, especially after profuse perspiration. In many acute diseases, the urine differs from day to day with regard to its color, transparency, sediments, etc.; this is termed *variable* urine. In certain gangrenous inflammations the urine is almost *cold* at the moment of excretion. A diminution of its temperature has also been noticed in the cold stage of intermittent fever.

* Vid. our Treatise on Nephritis, *Archiv. Gén. de Méd.* v. 1, 3d Ser. pp. 5 and 477.

† *Jumentum*, beast of burden; urine that resembles that of mules, horses, etc.

Little is known of the taste of urine in a state of disease, on account of the natural repugnance to experiments of this nature. We know, however, that in diabetes mellitus it has a sweet taste, and that it is almost insipid after the hysterical paroxysm.

M. Rayer, has made numerous experiments upon the specific gravity of the urine, which varies, in health, according as it has been secreted after fasting, during or after meals, etc. He fixed the mean specific gravity of the urine excreted at the hour of waking in the morning,* at 1.018, that of water being 1.000. The same physician found that in diabetes mellitus, the density of the urine is much more considerable, while it is less in diabetes insipidus. In Bright's disease, except in the first or acute stage, it is generally lower than in health. The specific gravity of the urine may be a circumstance of practical advantage in diabetes mellitus. Examined at different hours of the day before and after meals, it may indicate the increase or diminution of the sugar.

The elements of the urine undergo variation in disease to a greater or less extent. Thus, the quantity of water may become very great, as in diabetes insipidus; in some nervous affections the urine is almost entirely aqueous. The other elements of the urine increase, on the contrary, in proportion, in most febrile diseases. The quantity of urea rarely increases in sickness, although it is very common, as M. Rayer has remarked to find it existing in a less proportion, which arises, perhaps, as much from abstinence from food, as from the influence exerted by disease itself on the renal secretion. It has not yet been proved that the quantity of urea is diminished in diseases of the liver; but in the granular affection of the kidneys its diminution is an almost invariable phenomenon. The uric acid, which enters into the composition of the urine in the proportion a *thousandth* in health, may increase in a remarkable manner; this has been particularly observed during the progress of rheumatic and gouty affections, and many inflammatory diseases, etc. This excess of uric acid often has the effect of producing red gravel in different parts of the urinary passages. This acid is generally found in combination with lime, soda, and particularly ammonia. There may also be a disproportion of phosphoric acid and the phosphates of lime and magnesia in the urine, which we notice in cases of rachitis, mollities ossium, and in some kinds of gravel; in all these cases the urine is more or less turbid. The salts of soda, potash, and ammonia, are sometimes found in more considerable quantities, and render the urine either neutral or alkaline. The alkalinity of the urine has also been ascertained in phosphatic gravel, in certain cases of Bright's disease and frequently in chronic nephritis, as in cases of old men enfeebled by privation and misery. It has been stated that alkalinity of the urine is frequent in the course of typhoid fevers. M. Rayer asserted that out of fifty cases he formed the urine alkaline but twice, and for the space of three days only, and the observations of M.

* *Maladies des Reins*, t. 1, p. 71.

Rostan agree on this point with those of M. Rayer. Brodie and Hunkel have remarked the alkalinity of the urine after traumatic or other lesions of the vertebral column; but as this has been contradicted, further observation will be necessary to determine it.

Mucus, which is one of the natural ingredients of the urine, may become developed in unusual quantities. We observe this in some inflammations of the bladder, in inflammations of the pelvis of the kidneys, and of the ureters.

The urine may also become changed by the presence of different substances foreign to its normal composition. Thus, sulphur has been found in it, and rare cases are mentioned of phosphorescent urine which shines in the dark at the moment of its emission. We shall not here refer to the hippuric, oxalic, benzoic, carbonic, butyric and prussic, xanthic and cystic, acids which have been accidentally discovered in the urine under the influence of various and often inappreciable causes. But there are other substances which we find more commonly in the urine, whose existence in it is easy to prove and which furnish signs too important to be omitted; such are, blood, albumen, sugar, pus, semen, fecal matters, gas, intestinal worms, gravel, and many other foreign bodies.

The urine sometimes contains blood which may come from the different parts of the urinary passages. It varies in quantity, and is more or less thoroughly mixed with the urine; sometimes is in a fluid state, and sometimes exists in the form of blackish clots. Occasionally it is discharged in the form of full or tubulous filaments, which have been mistaken for worms. This clotted form indicates the coagulation of blood in the urethra previously effused in the kidney itself. Bloody urine, when left to repose, forms a blackish sediment composed of bloody globules and fibrine. The quantity of the blood is sometimes so small that we can ascertain the existence of the globules only by the aid of the microscope. The presence of blood in the urine is almost always an indication of a cancerous or calculous affection of some part of the urinary passages, and particularly the kidneys or bladder; it has been also observed in scurvy, in severe cases of variola, and in pestilential diseases.

The urine may contain albumen in a greater or less quantity, the presence of which we can ascertain by the application of heat or nitric acid, which produce a white and flocculent precipitate. The presence of a very great quantity of albumen in the urine, together with a perceptible diminution of its specific gravity and of the proportion of urea and of the salts which it contains, constitutes the most important sign of that species of dropsy connected with disease of the kidneys, first described by Dr. Bright. The urine is also albuminous, but generally to a much less degree, in the dropsy that succeeds scarlatina and the decline of certain acute diseases, as Dr. Martin Solon has proved. The urine may contain at the same time albumen, blood and pus in grave affections of the urinary organs and in some diseases of the prostate.

The opinion was for a long time entertained, and even recently,

by men of great merit, that the urine of nursing women or of women soon after parturition, may contain milk. These opinions, however, were founded upon no exact observation or experiment, and there is reason to suspect that the physicians and chemists that entertained them, were deceived by the turbid appearance of the fluid, by the presence of foreign matter, and particularly pus or a fatty substance. Authors, and especially Prout, have spoken of chylous urine, that is to say, urine containing the organic principles of chyle, visible with the aid of the microscope; but the characters of this kind of urine are not yet clearly ascertained, and besides, the chylous appearance may be owing to the presence of a fatty matter in the urine. Ancient writers mentioned the existence of fat or oil in the urine, during the course of chronic diseases with progressive emaciation; but this assertion has not been verified, and M. Rayer sought in vain for these substances in the urine of phthisical patients.

Sugar is also found to exist in the urine. This has not only been proved by the taste, but has been verified by chemists in a more satisfactory manner, by the spontaneous fermentation of the urine and by the actual separation of the sugar from its other elements. The presence of sugar in the urine is a pathognomonic sign of that species of diabetes termed *mellitus*. This urine has a specific gravity greater than that of the healthy individual, although it contains less urea and less salts.

Urine containing pus presents, even at the moment of its emission, a turbid and milky appearance. Left in a quiescent state it becomes transparent, and an opaque deposit collects in its lower part, forming a stratum varying in thickness. This urine decomposes rapidly and becomes alkaline. Pus is generally readily distinguished by its qualities where it exists in the urine in any considerable quantity; but when its proportion is small, and when mingled with mucus and salts, its presence is very difficult to prove. Chemical and microscopic examination may be resorted to under such circumstances, with advantage, but in the present state of the science, as we have before remarked, it cannot inspire entire confidence. The ascertained presence of pus in the urine is always an alarming symptom in prognosis, and very important in diagnosis. It is a certain sign either of inflammation of the kidneys or bladder, or of an abscess formed near the urinary organs and opening into their cavity. Examination of the symptoms preceding the emission of purulent urine and of the organs themselves, enable us frequently to discover the parts in which the pus has been formed.

In the course of blennorrhagia the urine sometimes acquires contagious properties, doubtless owing to the particles of urethral mucus which it carries away with it. Mertens, Astruc and Chausier, have seen individuals that have contracted a blennorrhagic ophthalmia in consequence of bathing the eyes with urine in the course of urethritis.

The urine sometimes contains, also, small solid concretions,

some of which are as fine as sand, while others are somewhat larger and equalling grains of hemp seed in size. The first kind is excreted by the patient unconsciously. The second indicates its passage through the canal of the urethra by pain more or less acute, and sometimes by a sensation of *tearing*, according as the surface of these particles is smooth or rough, and according as their bulk is greater or less. In some cases their expulsion is attended with no pain, and the patient is only conscious of their existence from the noise of their fall into the vessel that receives them. These concretions are generally formed in the kidneys, and their presence in the urine should always lead us to fear that they actually exist in the kidneys, and that others are in process of formation. In some rare instances these concretions are convex on one side and concave on the other, and represent a portion of the external layer of a calculus which has exfoliated in the bladder, and are pathognomic of its presence.

The saline concretions which form in the urinary passages vary considerably in regard to physical and chemical properties. The smallest of them, those that do not exceed a pea in size, are termed *gravel*; all of greater bulk than this are called *calculi*. Their number is more or less considerable, and is, generally, in inverse ratio to their volume. They are round, oval or irregular in form, sometimes presenting a rough surface (*calculi muraux*). Their surface often presents one or more faces, an almost certain indication of the simultaneous existence of several stones in some part of the urinary passages. There are cases of gravel or calculi that break with the least pressure, while others have the resistance and firmness of the hardest stone. A greater part of the urinary concretions are formed of uric acid, and are then of a red color bordering more or less upon yellow. Next in order of frequency are calculi of the ammoniaco-magnesian phosphate, crystalized into prisms and of a whitish color. After these come calculi of the oxalate of lime which are black, brown or grayish; after these, calculi of the phosphate of lime and magnesia; and lastly, M. Magendie has described a hairy gravel, of which he gives three instances; in these cases, hairs had formed upon the surface of the saline concretions, probably proceeding from some cyst opening into some of the urinary passages.

There have also been discovered in the urine masses of tuberculous and encephaloid matter coming from the kidneys, and furnishing in some cases very important diagnostic signs.

In cases of seminal loss, of urethral strictures and diseases of the prostate and of the ejaculatory ducts, the semen may flow back into the bladder, and be excreted, mingled with urine. From the experiments of M. Orfila, it appears that the urine excreted immediately, or some hours, after a pollution or an ejaculation, carries with it, and consequently contains, spermatozoa which had remained in the canal of the urethra. However few in number they may be, they always sink to the bottom of the vessel, and can be readily distinguished with the microscope.

In cases in which there is a communication between the urinary passages and the rectum, or a portion of an intestine, the urine may contain fecal matters, gas may escape through the urethra, and worms may also be expelled in the same manner. We may also explain in the same way the existence of foreign bodies in the bladder, such as pins, fruit seeds, &c., which have been known to form the nuclei of vesical calculi. Sometimes too, foreign bodies find their way into the urinary passages through an external wound, or are introduced by the urethra. The presence of substances in the urine, which can only come from the intestines is, in most cases, a pathognomonic sign of grave and deep-seated alterations which no other symptom could have revealed.

In cases in which a perforation has taken place between the bladder and rectum, it is often possible, by introducing a probe into the bladder and a finger into the intestine, to feel it; it may even happen that the opening of the communication is sufficiently large to admit the passage of the finger itself from the rectum into the bladder.

A great many substances administered under the name of medicines and introduced into the stomach, may be discovered in the urine. Chemists assert that they have found, in the urine, iodine, mercury, arsenic, iron, the acetate and tartrate of potash, the alkaline sulphates and carbonates, the nitrate of potash, the sulphate of quinine, etc.

The urine, left to itself, does not generally preserve that homogeneousness which it has at the moment of excretion. Many of its elements become separated from its mass, and form pellicles, deposits and various suspensions. To thoroughly appreciate these various phenomena, it is necessary to place the urine in a transparent vessel at the very moment of excretion, and leave it, for five or six hours at least, in a state of repose.

The *pellicle*, *cream* or *crown* (*urinæ corona*, *cremor*) is a sort of very thin membrane that forms upon the surface of the urine.

The *suspension* which begins to appear in the urine some hours after excretion, is of two kinds; the first, called *nebula* (*nubecula*, *nubes*), is that which forms near the superior surface of the fluid; the second, which settles near the bottom, is called *enæorema*.* We may also observe in some cases a *mean* suspension in the urine, midway between the surface and the bottom, which has received no particular designation. The urine presents these various suspensions in most acute diseases. According to some authors, the suspension is more or less removed from the bottom of the vessel, in proportion as the disease is nearer its termination or otherwise. This rule, however, has numerous exceptions.

Deposits, also called *sediment* (*sedimentum*, *hypostasis*),† are caused by the heaviest substances reuniting at the bottom of the vessel, and forming a stratum of greater or less thickness.

* Ἐναώρημα, from ἀνορέω, I raise.

† Υποστάσις, from ὑποστώ, I am under.

Sediment does not generally appear till towards the decline of acute diseases. It does not always form at this period, but it is rare to observe it at any other. Ancient writers laid much stress upon the importance of sediment as a diagnostic sign of intermittent fevers. They considered this phenomenon invariable in the third stage of the paroxysms. Sediment not only collects upon the bottom of the vessel that receives the urine, but forms often upon its lateral walls a thin stratum, sufficiently defined, however, to give the fluid a turbid appearance. Upon inclining the vessel, this disappears, and we then see on one side perfectly transparent urine underneath the deposit, and on the other, the deposit alone forming an opaque coat upon the walls of the vessel. The sediment is generally of a whitish or grayish color; as frequently, perhaps, in intermittent fevers (*sedimentum lateritium*), it is of a rosy color, or the color of brick dust. It is often brown or black in jaundice and some acute fatal diseases; and in a few extremely rare cases, of a bluish color, owing either to the presence of a peculiar substance, called by M. Braconnot *cyanourine*, or to hydrocyanate of iron, according to the observations of M. M. Julia,* Batt† and Mojon.‡ The sediment often has the appearance of dust, or of meal or bran coarsely ground; this is the furfuraceous sediment, (*sedimentum furfuraceum*)§. At other times it is formed of a mucous matter either united into flocculi, or collected at the bottom of the vessel in an even and semi-transparent stratum. This is the mucous sediment. We designate by the epithet *sandy* or *gravelly*, the sediment that contains sand or gravel (*sedimentum arenosum*). *Purulent* sediment is that consisting of pus, etc. Deposits, nebulae, and pellicles that form in the urine have been examined by the microscope and subjected to chemical analysis. The nature of these various urinary products varies according as the urine itself is acid or alkaline. In acid urine, the nebulae and enaëremata are formed by thin lamellae of epithelium, urates, uric acid and mucus. The yellow, reddish or red sediments are formed of uric acid or urate of ammonia, distinguishable from each other by their modes of crystallization which the microscope enables us to determine with precision. Alkaline urine, more or less discolored, is generally accompanied by a white or slightly yellow sediment disposed into regular crystals, or forming an amorphous and pulverulent mass: this sediment is generally composed of phosphate of lime and the ammoniaco-magnesian phosphate, mingled often with pus adulterated by ammonia, which gives it a viscous or mucous appearance. We may also find in it sanguineous globules, spermatozoa, the coloring matters of the bile, and occasionally various salts of which lime forms the base, etc.

* *Journal de Chimie*, vol. 1, p. 330.

† *De Urinæ Sedimentum Ceruleum Demittente*, 1809.

‡ *Journal de Médéc.*, vol. 72, p. 174.

§ *Furfur*, meal.

§ III. *Excretions.*

Having examined in succession the principal morbid phenomena presented by the secretions, it remains to say a few words with regard to the derangements of the excretions, independently of those of the secretions.

The excretions which are under the influence of the will, are those alone of sufficient importance to be discussed in this place. These excretions may become in disease more or less frequent than in health, and may be accompanied with considerable efforts or be effected too easily. They may be involuntary, as in many grave diseases, and on the other hand, the will may be unable to promote them, as in cases of retention of the urine and occlusion of the rectum by hardened fæces. Sometimes the desire of excretion is continual, painful and almost ineffectual, as in tenesmus of the rectum or bladder. We can here only refer to these symptoms, as they have been discussed elsewhere, but must confine ourselves to the consideration of the phenomena which have not yet been enumerated; such are those which arise from the occlusion of the excretory canals, whether these canals are, or are not, provided with sphincters, and whether the excretions are involuntary or otherwise.

The causes which produce occlusion of these canals are very various, but may be divided into three classes. The canal is sometimes choked by an obstacle contained in its cavity, a calculus, for example; sometimes its cavity is obliterated by the thickening of its walls, and sometimes by an external compression, as of a neighboring tumor. This occlusion is followed by various results. 1. The excretions of the fluid is prevented. This suppression is often difficult to prove during life in cases in which the secretory organs being double, like those of the urine, the occlusion of one of the excretory canals does not entirely interrupt the excretion of the fluid; and in those cases in which the functions of the secretory organs are of minor importance or merely auxiliary. But whenever the viscus to which the obliterated canal belongs is single, and plays an important part in the economy, as the liver, for example, the occlusion of the canal is soon followed by remarkable phenomena, such as acute pains, a yellow color in the skin and urine, discoloration of the fæcal matters and various derangements of the digestive functions. 2. Another consequence of occlusion is distension of the canal from its source to the obstacle, and after a certain time its contraction and, sometimes, entire obliteration from the obstacle to its point of termination. This distension is apparent in the duct of Steno, vasa deferentia and lacrymal sac, but entirely escapes our direct observation whenever the organ is deeply seated, as, for example, the liver, kidney and pancreas. 3. The progressive distension of the canals by the fluids which incessantly flow into them, represents a force which has a tendency to remove the obstacle which produces the occlu-

sion, to raise the tumor which presses upon the canal, to dilate its lateral walls, or to push before it the foreign body contained in it. In this last case, the distension of the canal, as far as the calculus, would seem to favor its progression; for it is difficult to suppose that this distension being so considerable as far as the calculus, might not extend beyond it. And, on the other hand, the obstacle being situated at the point of junction of two portions of a canal, one of which is continually dilating while the other preserves its natural size, may frequently fall back into the dilated portion, and by its displacement suffer the collected fluid to escape through the opening, at least for a time. 4. Lastly, if the obstacle is neither pushed out nor displaced, death, sooner or later, may be the consequence, as in cases of retention of urine, intestinal matters and bile, sometimes by the rupture of the canal above the obstacle, and sometimes, by the retention in the economy of substances naturally excreted, the changes they undergo, the inflammation they produce in the parts containing them, and, in some cases, the infection which follows their absorption into the circulatory current.

SECTION SIXTH.

Symptoms furnished by Absorption.

Having examined the principal disorders of the secretions and excretions, it remains for us to speak of those presented by the different species of absorption.

We may remark, in the first place, that in a great number of cases, derangements of absorption may be confounded with those of exhalation, since the same phenomenon, the accumulation of serum in the pleura or peritoneum, for example, may be equally the result of a diminished absorption or an increased exhalation.

But there are other circumstances, under which it is impossible not to recognize the effect of absorption. The gradual or rapid disappearance of pus collected in a bubo, of blood extravasated under the skin in consequence of a contusion, of serum in the cellular tissue or in a serous membrane, are evidently phenomena which absorption alone can produce. Primary ulceration, when not arising from a loss of substance, or from the separation of an eschar, is regarded by most physicians as the result of a morbid absorption acting upon the solids themselves, and carrying away into the current of the circulation the elements of which they consist.

It is generally believed that there is between the different absorptions an analogy similar to that existing between the different secretions.

Thus, when absorption is very active in the digestive canal, after eating, for example, the exterior absorption, cutaneous and pulmonary, is probably diminished. It undoubtedly becomes more active in the morning before breakfast, since at this period of the

day the gravity of the body is increased, as was proved by the experiments of the celebrated Sanctorius, who, from the zeal and perseverance with which he devoted himself to these inquiries, deserves to have disciples and rivals. Many practitioners think, not without reason, that medicinal preparations left to the action of cutaneous absorption, mercurial ointment, for example, may be administered to greater advantage at this hour of the day.

The absorption of the fat contained in the vesicles, in patients subjected to a severe course of diet, comes in aid of the opinion that when absorption is not sufficiently active in one part, it increases in another. The same may be said of the advantageous effects that sometimes follow a rigorous diet in the treatment of certain engorgements; the absorption which, for want of substance, is not effected in the digestive canal, acts with more energy in other parts, and may cause the progressive diminution of a hypertrophied viscus, as well as that of the whole body. *Resolution*, which we shall consider in another place, appears to be nothing but a *remedial* absorption.

Besides this kind of equilibrium, which we observe in disease between the secretions on the one hand and the absorptions on the other, there are also cases in which these two functions act in concert. In the course of an acute phlegmasia, pleurisy for example, so long as the disease is making progress, and a sero-purulent fluid is exhaled in the pleura, the skin is dry and the urine excreted in small quantities. But when the absorption begins to act upon the effused liquid, the skin often becomes moist and there is an abundant flow of urine; analogous phenomena take place, and are more easily observed in the progressive diminution of anasarca and ascites. In these cases, exhalation carries away through the skin, kidneys, and mucous membrane of the digestive passages, a greater quantity of fluid, in proportion as absorption takes up the serum effused in the serous and cellular tissues. The considerable increase of certain secretions, the urine, for example, in diabetes, and abdominal serum in ascites, is necessarily connected with a similar increase of absorption, and especially the pulmonary or cutaneous absorption. The excretion of from twenty to forty pounds of urine daily, for many months together, in diabetes, and the daily increase of from ten to twelve pounds in the weight of the body in some cases of ascites, in which the amount of food taken is proportionally small, settle this question beyond a doubt. As a general rule, whenever absorption becomes very active in any tissues or organs, the exhalations and secretions become so in others, and vice versa. It is by the application of this law to the treatment of disease, that the physician endeavors to promote the absorption of fluid collected in the serous membranes by increasing the intestinal urinary or cutaneous secretions, and is sometimes enabled to diminish the urinary secretion in diabetes, by promoting profuse perspiration.

SECTION SEVENTH.

Symptoms furnished by Nutrition.

The derangements of nutrition in disease are almost infinite, but in most cases are not appreciable by the senses during life, and consequently do not belong to symptomatology. There are a few, however, properly within its domain, which we proceed to enumerate.

Nutrition may be increased, diminished or perverted. It can only be entirely lost in those parts already deprived of life.

Increased activity of nutrition is indicated by the increased volume of all, or nearly all, the constituent parts of the body, but more particularly of the viscera contained in the chest and abdomen, of the muscles and of the adipose tissue. This may easily be confounded with the obesity produced exclusively by an accumulation of fat in the cellular tissue. The latter phenomenon, though rare, may occur in disease (page 76), while a general increase of volume of the muscles and viscera, is never a symptom. It is otherwise when this increase is partial: such is that of which the heart and liver are frequently the seat, and which we designate by the term hypertrophy, an affection rarely simple, and nearly always connected with some obscure modification in the texture of these organs, and particularly with some disturbance in their functions, more or less apparent.

In nearly all diseases of any importance, nutrition becomes languid. This is apparent from the emaciation that accompanies them. When this languid nutrition exists in but one part of the body, it gives rise to a partial emaciation or atrophy, a phenomenon particularly owing to the entire inaction of organs, or to a prolonged compression of them. It is also of frequent occurrence in the muscles of limbs under the influence of these two causes, and necropsies prove that the internal organs, as, for example, the lung in pleuritic effusion, may also become the seat of it under the influence of the latter cause.

Atrophy of an organ may also follow a disorder affecting the circulation or innervation. This principle has been ingeniously and usefully applied to the treatment of certain diseases. Thus, Maunoir of Geneva, and Charles Bell, have produced the atrophy of a voluminous testicle, by a ligature round the spermatic artery; and many other surgeons have arrested the progress, and brought about the decrease of considerable tumors in the face, by tying the common carotid artery on the corresponding side. The ligature or division of nerves often produces atrophy, also, in the muscles to which they are distributed. The suspension of nervous action appears, also, to have had the effect, in some cases, of arresting the development, and even causing the atrophy, of certain morbid tissues. Dr. Duparque * states that he saw an ulcerated

* *Maladies de l'Uterus.*

cancer of the breast diminish and disappear, in consequence of a paralysis affecting the side of the body corresponding to the diseased part. This fact, alone, perhaps, in the annals of science, requires confirmation.

Emaciation should not be confounded with *leanness*. The latter is that condition of the sound or diseased body in which there is a natural thinness of flesh; while the former is that state in which there is a gradual wasting of the body. An emaciated person may still have *embonpoint*, and a person may be lean who is daily gaining flesh. We have spoken of this phenomenon in the article devoted to the exterior of the body (page 77), and do not propose to recur to it here.

Nutrition is as often perverted as diminished. It is to this perversion that we may refer all the organic lesions which are not the result of an external cause: the production of cysts, vicious curvature of the bones, the various degenerations and the phlegmasiæ themselves, seem to be originally owing to a modification of nutrition.

Nutrition furnishes another class of phenomena which belong still more to symptomatology. We refer to the irregularities of growth in the growing period of life. The growth, which, in health, is effected in different individuals according to a variable progression, but always within certain limits, presents, in disease, many remarkable anomalies. We see children whose growth seems to be entirely suspended for one, and even for many years. This phenomenon is not uncommon in rachitis, of which it is sometimes the first symptom. We have seen at the Clinical School of the Hotel Dieu, a person fifteen years of age, affected with diabetes, whose growth had been suspended since he was twelve years of age, the period at which the diabetes had commenced. We see a greater number of persons, whose length of body increases one, and sometimes several inches during the very limited course of an acute disease. These two opposite phenomena are equally of unfavorable augury, though the latter indicates immediate danger, while the former should lead us to fear that the development of the body is permanently arrested.

ARTICLE THIRD.

Symptoms furnished by the Generative Functions.

THE symptoms of which we have hitherto spoken are, almost without exception, common to the two sexes, but those which it remains for us to enumerate are peculiar to the one or the other. Having already pointed out the principal changes that disease produces in the external organs of generation, in the section devoted to the consideration of the exterior of body, we shall now merely say a few words upon the disorders of the functions designed for the reproduction of the species. We shall consider them successively in man and woman.

A. In man, the secretion of semen is seldom increased in disease. It may occur, however, in erotic melancholy, and is one of the principal symptoms of *satyriasis*. The diminution, or almost entire suspension, of this secretion is, on the contrary, of frequent occurrence, as may be inferred from the constant flaccidity of the penis and the absence of erection, in the course of most diseases.

The excretion of the semen is susceptible of different disorders. It is attended with pain in the phlegmasiæ of the urethra. With some individuals it takes place when the penis is not in a state of erection, particularly during the efforts attending stools. In other cases, the emission is feeble, or interrupted by some obstacle (*dispermasia*),* and the seminal fluid, instead of being excreted in jets, flows slowly through the orifice of the urethra. In some persons, emission takes place upon a simple touch, and before the introduction of the penis into the vagina. Sometimes there is a deviation of the semen, which, after being forced into the canal of the urethra, flows back into the bladder whence it is excreted mingled with urine. This deviation is owing to the wrong direction of the ejaculatory ducts which open into the canal of the urethra, from before, backward, that is, contrary to the natural arrangement. It sometimes follows, also, stricture of the urethra.

Impotency, or inability to effect the venereal act, may arise from a multitude of different causes, the consideration of which would be irrelevant in this connection. We will merely remark, after referring to the influence of imagination upon this phenomenon, that sometimes the penis is not capable of erection, and sometimes emission does not take place, at least at the proper time. The loss of power of erection is, in a certain number of cases, the first, or one of the first symptoms of a disease of the nervous centres, and particularly the spinal marrow.

We observe, in some cases of disease, frequent and even habitual erections, taking place independently of the natural causes that excite them. This phenomenon occurs, particularly, in cases of vesical calculi, and in certain chronic eruptions of the skin. The application of a blister will produce it in some persons.

B. In woman, the functions of reproduction present a greater number of symptoms. The menses, the lochia, and the secretion of milk deserve particular attention.

In some young females the catamenia do not appear at the usual age. This delay may be owing to the general state of the constitution, or be connected with the condition of the uterus or its appendages. In most cases, however, it is referable to disease in a remote organ, and particularly the lungs.

The menstrual flux is sometimes *increased* in disease. This increase, when very considerable, constitutes menorrhagia, and may take place at the usual menstrual periods, or in their intervals. When the blood escapes in clots, it is always important to examine

* *Δύς*, with difficulty ; *σπέρμα*, semen.

it with care, in order to ascertain whether it contains a fœtus or its membranes, particularly when the flow of blood is accompanied with expulsive pains analogous to those of parturition. Metrorrhagia is often symptomatic of abortion either in progress or already effected, and is sometimes connected with disease of the uterus, such as polypus, fibrous tumor, cancers, granulated metritis, etc. Metrorrhagias, or morbid hæmorrhages of the uterus, sometimes occur spontaneously in the course of acute diseases, particularly during eruptive fevers and variola, and give a graver character to prognosis. In all these cases an examination of the uterus by the touch is indispensable. The *diminution* of the periodical flux is much more frequent, occurring in most chronic affections. In their last stage it is almost always *suspended*. *Deviations* of the menstrual flux have also been very frequently observed, and may take place through a great number of different passages, but particularly through one of the mucous membranes or the skin.

The flow of *lochia* after parturition, may be unusually great; more frequently, however, if any disease exist at this period, this discharge is much diminished in quantity, and sometimes even entirely suppressed, as in puerperal peritonitis.

The volume of the mammæ is increased during pregnancy. This phenomenon occurs, also, but rarely, in certain affections of the uterus. There are a great number of females whose menstrual periods are preceded and accompanied by a perceptible tumefaction of the mammæ, while at the same time they become the seat of a sensibility more or less acute. It is particularly, however, a few days after parturition that the mammæ present a great increase of volume, at the time that the secretion of milk is effected. The absence of tumefaction of the mammæ or their sudden falling away, under such circumstances, is always a suspicious phenomenon. The mammæ diminish in volume, and sometimes become actually atrophied, in women advanced in years.

The secretion of the milk never increases during the progress of disease, but nearly always diminishes, and is sometimes suppressed. This suppression is generally accompanied by shrinking of the mammæ, and sometimes by their induration, a phenomenon attributed by some authors to the coagulation of the milk in the mammary gland.—The microscopic examination of the milk is not without interest in a pathological point of view. By means of this examination, the milk has sometimes been found to be mingled with small quantities of pus.—With regard to *deviations* of the milk, of which so much has been said, and which was once thought to have been proved by the *milky appearance* of pus in abscesses, of leucorrhæal mucus, or of the fluid furnished by the inflamed pleura or peritoneum, they are no longer believed to take place, and consequently need not here be discussed. The facts, that we find this lactiferous matter in men as well as women, and that if it present the color of milk, it has none of its properties, are sufficient to overthrow the hypothesis if it still has any advocates. Women are also accustomed to attribute the fixed or undefined pains, and

the cutaneous eruptions that follow delivery, to the presence of milk in the economy. They designate these symptoms, whatever they may be, by the term *diffused milk*. This second species of deviation is a mere unfounded hypothesis.

Barrenness may follow more various causes than those that give rise to impotency in man. The most common, are vicious conformation or position of the os uteri, the obliteration of the fallopian tubes, the various lesions of the ovaries, and the presence of polypi in the neck of the uterus.

We may also refer to this head of disorders furnished by the generative functions of women, the facility with which abortion is effected in some, and the inability of others to carry the product of conception during the natural period of pregnancy.

In both sexes the venereal desire (*appetitus venerens*) may be increased, diminished or perverted. It is increased in satyriasis and nymphomania, and in some cases of erotic melancholy. It is diminished in most diseases, and particularly in leucorrhœa in women, and in both sexes in persons addicted to masturbation. Its entire loss is designated by the term *anaphrodisia* (*anaphrodisia*.*). It is perverted in certain cases of mania, and some other neuroses, in which the patient is incessantly addicted to masturbation, or is led to the commission of unnatural acts.

Such are the principal symptoms furnished by the generative functions. To these we may add those that are discovered by touch and the *speculum uteri*, of which we shall give a summary in the chapter on diagnosis.

ARTICLE FOURTH.

Symptoms considered in Disease.

HAVING thus far treated of symptoms in the abstract, we shall now proceed to consider them in connection with disease, of which they constitute the elements.

Sometimes but one symptom makes its appearance; as in cases of vomiting, deafness or epistaxis; but generally many occur simultaneously. These symptoms are grouped in a thousand ways, and by their various combinations, constitute the *phenomenal* part, or the apparent features of a disease: they lead to the knowledge of internal lesions when these exist, and are of the highest importance, in all cases, in enabling us to decide upon the nature of the disease with which the patient is affected. The symptoms which appear simultaneously in the same patient, are often in intimate connection with each other; they are not all of equal importance, either in relation to the diagnosis of the disease or the influence they may exert upon its progress; lastly, they do

* A privative, ἀφροδίσια, pleasure.

not all appear at the same time. We shall now briefly consider them in these different points of view.

§ I. It is highly important in the appreciation of symptoms, to be able in a case of general functional disorder, to distinguish which function was primarily affected, and not to confound symptoms which may be called *primary*, or *local*, with their accompanying *secondary*, or *general*, phenomena. In pleurisy, for example, there may be observed simultaneously, redness of the face, pain in the chest, feebleness or disorder of the intellectual functions, thirst, interrupted voice, cough, dyspnœa, frequency of the pulse, increased heat, high colored urine, and many other symptoms which may accompany the disease during the whole, or a part, of its duration. The importance of isolating the primary, from the secondary, phenomena, is here evident. The first, are pain in the side, dyspnœa, and cough, to which may be added the difficulty of speech; the second, are the color of the face, headache, frequency of the pulse, heat, disordered secretions, &c. The sensible changes presented by the inflamed pleura explain all the primary phenomena, as the pain, dyspnœa and cough. The connection between the symptoms and this disease may be also easily explained. The pleuritic pain, and probably also the inflamed state of the pleura, oblige the patient to take short and frequent inspirations; respiration is so intimately connected with the circulation, that when one is accelerated the other necessarily becomes so. The frequency of these two functions causes elevation of heat, in the production of which both appear to concur; the increased heat augments the thirst, and renders the urine more highly charged.

But it is impossible, in most cases, to discover the connection between the various symptoms, and we are compelled to attribute them to the invisible bond of sympathy. The relations between all parts of the body in health as well as disease are so intimate, that no one can become gravely affected in its structure or functions, without all the others, or at least many of them, participating in some degree. *Sympathetic phenomena*, are those which arise from this connection alone between the different organs, unaccompanied by any primary lesion of the part which is their seat, and *sympathy** is the term applied to the organic condition which presides over the production of these phenomena. This produces, in disease, effects more various and extraordinary than in health. Without here speaking of that universal or general sympathy, by virtue of which the whole economy participates in the disorder of some organ or function, as is observed in the inflammation of a viscus or any other internal disease, let us consider for a moment the phenomena which depend upon special or particular sympathy, or that which exclusively exists between certain organs.

Hunter divided these numerous and various phenomena into

* Συν, with, at the same time; παθος, affection.

three series, according to their appearance in organs which are continuous, contiguous or remote; this division is more simple and natural than those since established. To the sympathy of continuity, may be referred the pain felt in the whole track of a nerve when any part of it is irritated or contused; the general convulsions and tetanus following laceration of a nervous filament; the itching of the nasal fossæ in persons affected with intestinal worms, and pain in the glans penis in those affected with calculus in the bladder. The sympathy of contiguity produces vomiting in peritonitis, dysuria in hæmorrhoidal swelling, dysentery, &c. Remote sympathy sometimes affects similar organs, or those associated in the performance of the same function, and, sometimes, parts between which no relation exists. In complete amaurosis of one side, the oscillations of the iris are sometimes observed to be transmitted from the sound eye to that which is incapable of distinguishing the light, and, when one of these organs is inflamed, the other cannot endure the light. These various phenomena are attributable to the similarity in the structure and functions of the affected organs. The relation existing between the mammæ and uterus, and between the expiratory muscles and lungs, seem to account, to a certain extent, for the shrinking or swelling of the mammæ in certain affections of the uterus, and the involuntary cough excited by the accumulation of mucus in the trachea. The examples of remote sympathy between two organs which do not concur to the performance of the same functions, are very numerous, and cannot be explained by nervous anastomoses, although many physicians have thus endeavored to account for it in some sympathetic phenomena of this kind, and particularly in the pain of the right shoulder, sometimes accompanying inflammation of the liver. The cough sometimes observed in certain affections of the stomach, liver and uterus; the vomiting which occurs in diseases of the brain, lungs, kidneys and uterus; the trembling of the lower lip and ptyalism which often precede vomiting, dilatation of the pupils in verminous affections, and pain in the knee in *hip disease*, are all sympathetic phenomena, most of which have been noticed, but which are entirely inexplicable.

Such are the principal effects of morbid sympathy, which, as has been said, transmits throughout the economy the irradiations of the affected organ.

§ II. The symptoms which appear simultaneously in the course of any disease, are not all of equal importance. There are those which are *principal* or characteristic, and others, that are called *accessory*.

When all the functions of the economy are simultaneously deranged, many of them severely, no organ being more particularly affected than the others, the most apparent phenomena become the principal symptoms, the others being only accessory: this is particularly observed in malignant intermittent fevers. In those diseases, on the contrary, in which a single organ is the seat of the

affection, the importance of the symptoms is not determined by their intensity, but by their seat and the function which is deranged. Thus in peripneumony, a slight pain in one side and a few rusty colored sputa are the principal symptoms; while the violent headache, high colored urine, and high fever, are but accessory phenomena.

§ III. Symptoms have been also divided into *active* and *passive*.

In defining disease to be a struggle of nature, in which she is endeavoring to repel or destroy the morbid cause, it seems to be forgotten that, in some affections, no sign of salutary reaction can be perceived, and that most of the symptoms tend, on the contrary, to hasten the fatal result. Thus in pulmonary phthisis, the night sweats, diarrhœa, cough and hæmoptysis, daily aggravate the condition of the patient. But there are, also, other affections in which no favorable reaction can be discovered. The peculiar phenomena developed around a thorn imbedded in the skin, the fever which accompanies the inflammation of this membrane and the subjacent parts, the suppuration which occurs around the foreign body, and causes its expulsion after having produced absorption of the integuments in the part corresponding to the abscess, or destroyed the edges of the opening which gave exit to the material agent of the disease, are symptoms which we may, with some modern authors, term active.

In many acute diseases, most of the symptoms seem also to indicate, if not a concurrence of all the forces of the economy against the morbid cause, at least an evident struggle between them. But it must be admitted that, in most cases, the distinction into active and passive symptoms is utterly impossible.

§ IV. All the symptoms do not make their appearance at the commencement of diseases. In those whose course is rapid, the principal and characteristic symptoms are generally developed about the second or third day; in those which progress slowly, they may not appear for several months, and sometimes many years. In both cases, various accidental symptoms, called *epiphenomena*,* occur in the course of the affection, which differ from symptoms, properly so called, in not being as intimately connected with the existence of the disease. To the epiphenomena, or accidents, may be referred the *supervenientia*, the epigenemata, and, what have been styled in the schools, the symptoms of the cause, and the symptoms of the symptom. The *supervenientia* are phenomena foreign to the disease, but developed by it; as the appearance of the menstrual flux before the ordinary period; the pains of dentition occurring in children, but which were not experienced previous to the existing disease; and finally, the prodigious multitude of parasitic animals, worms, and particularly lice, observed in some patients. The *epigenemata* are accidents mani-

*" *Επι, upon; γαίνομαι, I appear.*

fested during the disease, but which depend upon some external cause, as the negligence of the assistants, or imprudence of the patients themselves. The *symptoms of the cause* are accidental phenomena which seem to depend, not upon the disease, which does not ordinarily produce them, but upon the determining cause of the disease itself; as in the case of hæmoptysis occurring in the course of an inflammatory fever. As this symptom does not ordinarily accompany this disease, it has been considered rather the result of the phlethora which produces the fever, than of the fever itself. Finally, should this hæmorrhage become sufficient to cause fainting, the latter would be considered, in the language of the schools, the *symptom of a symptom*. These distinctions have been justly abandoned, and their distinctive appellations have become to us almost unintelligible. The various accidents which may be added to the symptoms of disease may, without inconvenience, be classed under the head of *epiphenomena*.

Such are the principal points of view in which symptoms may be considered. In the chapter on diagnosis, we shall consider their semeiological value. — O.

CHAPTER VIII.

PROGRESS OR COURSE OF DISEASES.

THE progress of diseases (*morborum decursus*) may be defined to be the mode of production and succession of the material lesions and symptoms which characterize them.

The alterations occurring in the texture of organs during disease, elude, in many cases, our means of observation. There is, however, a considerable number of diseases in which we can, to a certain extent, trace the internal modifications and most apparent functional derangements. Without mentioning, in this place, those diseases whose seat is the cutaneous surface, or those occupying the orifices of the mucous membranes, or parts so near to these orifices, that the eye can observe and follow through their various phases, the changes which occur in their material disposition; there are certain other affections, as pleurisy, pneumonia and scirrhus of the stomach, in which, by the aid of all our explorative means, we are able to recognise the commencement, progress and diminution of a pleuritic effusion, the progressive conversion of pulmonary engorgement into hepatization, the extension of the disease from the point primarily affected, to other portions of the same organ, and the gradual increase of a tumor developed in the greater curvature of the stomach. But it should be recollected that material organic lesions are in most cases appreciable only after death; and in many instances, it is almost wholly by the

alterations which supervene in the symptoms, that the physician can trace and study the progress of diseases, in which are comprehended their type, their form, either acute or chronic, the distinction of their periods, and the examination of the numerous circumstances which influence them.

§ I. The *type* (*typus*) is the order in which the symptoms become aggravated or reproduced.

It is *continued* (*T. continuus*) when the symptoms persist uninterruptedly from the commencement to the termination of the disease; *periodical* or *intermittent* (*T. periodicus, intermittens*), when they appear and disappear at intervals.

A. A disease of continued type is sometimes equally intense throughout its course: it is then called *continent* (*morbus continens*); such is, in certain cases, the ephemeral inflammatory fever, exhibiting, during its short continuance, variations so slight as not to deserve notice; no acute disease would be continent, if this term be employed in a strict sense. The continued diseases are not usually of uniform intensity; they have *exacerbations* alternating with the decrease of the symptoms or *remission*. The *exacerbation*, *paroxysm* or *access*, consists in a more or less marked increase of one, many, or all of the symptoms belonging to the disease; the remission, in the opposite change.

There are certain continued affections, whose symptoms, instead of presenting these opposite alternations, increase regularly in intensity from the attack to the termination; there are others, on the contrary, which exhibit their greatest intensity at their commencement, and become gradually less serious. The fever which precedes the appearance of the catamenia, often exhibits an increasing intensity; the contrary has been observed in regard to ephemeral fever.

B. Periodical or intermittent diseases assume very various forms, either in regard to the actual *paroxysms** (*accessus*), (such is the name given to the reappearance of the symptoms) or to the interval between them. Certain paroxysms present, in the midst of variable symptoms, a chill, succeeded by heat and perspiration; others, which are also called *attacks*, do not exhibit these phenomena. The first are peculiar to intermittent fever; the latter are common to all other periodical diseases, such as epilepsy, hysteria and many nervous affections. The interval between the febrile paroxysms is called *apyrexia*† or *intermission* (*apyrexia, intermissio*); the intermediate periods of the attacks have received no particular appellation.

The intermittent or periodical type may present itself under various forms: the principal are the quotidian (*quotidianus*), ter-

* Παροξυσμός, ὀξύς, acute; παρὰ, beyond.

† Α privative, ψύρεξις, fever.

tertian (*tertianus*), and *quartan* (*quartanus*). In the first, the paroxysms occur every day, and resemble each other in duration, violence and principal symptoms; in the second, the paroxysms occur every second day; in the quartan type, every third day. A type presenting recurrences every fifth, and one every sixth day, have been admitted; but they have been very rarely observed, and many practitioners have thought that the reappearance of certain fevers with these unusual types should be considered accidental. The existence of monthly or annual intermittent fever is not now admitted. When an intermittent disease reappears at irregular intervals, it is *erratic* or *atypic* (*morbis erraticus*).

The quotidian, tertian, and quartan types present numerous varieties: 1. In the *double quotidian* (*quotidianus duplex*), two paroxysms occur every day. 2. In the *double tertian* (*tertianus duplex*), there is a paroxysm every day, those of alternate days corresponding; the third resembling the first, the fourth the second. 3. In the *duplicated tertian* (*tertianus duplicatus*), there are two paroxysms on the same day and one day of apyrexia. 4. If the type be *triple tertian* (*tertianus triplex*), there are two paroxysms on the first and on the third day, and one only on the second and fourth; these paroxysms correspond every second day. 5. The *double quartan* type (*quartanus duplex*) has one paroxysm on two successive days; the paroxysm of the fourth day is similar to that of the first, that of the fifth to that of the second, the apyrexia of the sixth day corresponds to that of the third. 6. In the *duplicated quartan* (*quartanus duplicatus*), there are two paroxysms on the same day, occurring every third day. 7. In the *triple quartan* (*quartanus triplex*), there is a paroxysm each day, as in the quotidian and double tertian; but in the triple quartan, the paroxysms correspond as to the hour, duration and severity, on each third day; the first three differ from each other, the fourth resembles the first, the fifth the second, the sixth the third; in the double tertian type, the paroxysm is different every other day, and corresponds every second day; in the quotidian there is constant similarity of access. Of all these varieties of intermittent types, the double tertian is the only one frequently met with: all the others may be considered exceptional.

C. Diseases, and fevers in particular, occasionally run an intermediate course between the continued and intermittent types; this is called the *remittent* type (*remittens*). Like the intermittent, it presents paroxysms of rigor, heat and sweating; and like the continued type, certain symptoms which persist uninterruptedly throughout the disease. Such is the exact definition given by *Pinel* of the term *remittent*; for, before his time, physicians confounded under this title, continued fever with exacerbations and remittent fevers properly so called.

The cause of the periodicity of diseases is one of the most obscure points in general pathology. We consider it quite natural

that phlogosis, degeneration, or any other organic alteration, should produce phenomena which continue without interruption, as does their determining cause. But it is quite otherwise with diseases which disappear and return at intervals, particularly if their return be regular. If we suppose the existence of a material lesion, how does it happen that its action is only transient? If functional derangement, unaccompanied by organic lesion, be assumed, we admit an effect without a cause. Many physicians have endeavored to explain a phenomenon whose conception even, presents such difficulty. The majority have concluded that the productive cause of the intermittent or periodical type ought to cease, at any rate, partially, by the very effect of the paroxysm; but that this cause, engendered within, or introduced into the system, confined to one point or disseminated through the whole body, was afterward reproduced with more or less promptitude, so as to excite a fresh paroxysm. The cause has, by some, been attributed to certain fluids of the economy, as the mucus, the bile or the blood; by others, to the nervous system; by others still, to fermentation or remarkable disturbance, or to obstruction of the circulation in any part of the body, the vena porta, for instance; by another class, it has been assigned to the sensitive principle; and lastly, some ascribe it to irritation or intermittent phlegmasia.

These and all other explanations are pure hypotheses, unsupported by sound reasons, and the majority of which are in opposition to facts. The periodicity of diseases is well known, but inexplicable. We recognise it, moreover, in a multitude of phenomena both out of the system and within it, and in no way can it be explained. The ebb and flow of the sea, the sleep of vegetables and animals, the regularity of the menstrual and hæmorrhoidal discharges, are each phenomena whose periodicity is as difficult of explanation as that of diseases. This, then, should rather be attributed to the weakness of human understanding than to the imperfection of the science.

§ II. Diseases have been divided by authors into acute and chronic, chiefly from their duration. We think, however, that there is a certain number which are *acute* in their course, although by their duration they belong to the chronic diseases; as also there are others, *chronic* in their course, but acute in duration. A disease is acute in its progress when the development, succession, and intensity of its characteristic symptoms announce an affection necessarily of short duration; on the contrary, when the symptoms appear, increase and succeed one another slowly, its course is essentially chronic. A typhoid fever which passes the fortieth and even the sixtieth day, is still an acute disease; a tubercular affection is a chronic disease, although it prove fatal in a shorter time.

§ III. All authors have divided disease into a certain number of *periods*; * this is the name applied to each of its successive phases.

* Περιόδος, circuit; ὁδός, path; περί, around.

The number of periods in disease has not been determined; the majority of authors recognise four or five; others have enumerated even eight in certain affections. With M. L. *Beauvais*, we shall admit three only, each distinguished by an important and lasting condition, as the increase, persistence and diminution of the symptoms, and we shall name them, according to universal usage, period of increase or progress, static, and declining periods. The invasion of the disease, being only its commencement, should not be considered as a period; if it be, the moment of its cessation should be made one also.

A. The first period, that of *increase, progress (incrementum)*, extends from the invasion to the highest degree of intensity manifested by the symptoms.

The *invasion* or *first appearance (invasio, initium morbi)*, is the moment at which the disease commences. It is never, or very rarely, appreciable in chronic affections, and generally is recognised with certainty in acute diseases alone; and even in them, is frequently so indistinct that it is difficult, or even impossible, to separate it from the time immediately preceding or following. This is the case whenever the intensity of the precursory phenomena increases gradually, so as to lead the system by degrees from a state of health to disease; or when an affection becomes manifest under certain natural conditions which have materially modified the functions, as for example, after parturition. Sometimes, it is true, rigor, syncope or some other remarkable phenomenon supervenes at such a time, which may be considered indicative of commencing disease; but uncertainty often exists.

The invasion of acute diseases, and especially those of a grave nature, is usually announced by a chill, of variable duration and severity; this is succeeded by heat, and alternates with it for an indefinite period manifesting itself at one time suddenly, in persons previously healthy, at another, after several days of indisposition; in most cases the patient is obliged to take his bed.

Invasion is accompanied by certain other phenomena; such are, a remarkable alteration of the countenance, tremor, convulsions, syncope, fixed pain in a particular organ, delirium, retching, vomiting, dyspnœa, accelerated pulse, hæmorrhage, etc.

The invasion of most diseases may happen at any hour of day or night; there are some which commence more particularly at certain hours. For example, paroxysms of asthma occur most frequently in the night; those of intermittent fever, of the quotidian type, in the morning; those of the tertian type, towards noon; of the quartan, in the latter part of the day; of symptomatic intermittent fever, in the evening. This fact explains the observation of many physicians, that intermittent fevers, whose paroxysms recur constantly at evening, usually resist the curative action of quinine; this remedy not acting in full force, except in cases of *essential* intermittents.

The phenomena which announce the invasion of a disease are

occasionally characteristic of it; they then persist through its subsequent stages; but, most frequently, they cease from the first day, (as the chill which is common to all the acute affections,) and are replaced by others.

The first period assumes various forms in different diseases. In those of an acute nature, the functional disturbance becomes daily more marked during the period of increase; the color of the skin is more decided; the sensations and intellectual functions are sometimes deranged, the thirst is increased, digestion becomes completely depraved, the tongue is more or less coated, the pulse more frequent, the heat of the body more elevated and nearly all the evacuations are diminished or suspended. In chronic diseases, this period is distinguished by the gradual development of the principal symptoms. Its duration may be very short in some acute diseases; it is usually of some months' continuance in chronic affections.

B. The second or *static* period (*violence, status, ἀκμῇ*), is distinguished by the permanent intensity of the symptoms, and, occasionally, by the appearance of new phenomena of greater or less gravity. It commences when the aggravation of the symptoms ceases, and terminates when their intensity diminishes, or when the disease approaches a fatal termination. Its duration in acute affections is usually shorter than that of the first period, in certain cases, however, it is longer.

C. The third period, that of *decline* (*decrementum*), or termination, we now merely mention, intending to devote an entire chapter to its consideration.

These three periods do not exist in every acute or chronic disease; in certain fevers, the symptoms present, from the commencement, their highest degree of intensity; the period of increase is not observed. In apoplexia fulminans there is but one period; indeed, it is often instantaneous. The same is true of some chronic affections; paralysis of any sense, deafness or amaurosis, for instance, is sometimes, from the moment of its occurrence, as complete as it will ever be in the lifetime of the patient; neither increase nor decline is observed. In some inevitably fatal chronic diseases, the symptoms gradually increase in severity from the commencement to the termination; there is, as it were, continual aggravation: the division into periods is not applicable to these cases; in cancer of the stomach, for example, there are many *degrees*, but properly speaking, no periods.

There are some affections, on the contrary, in which the three periods are very manifest; typhoid fever is an example, the external appearance being usually sufficient for the diagnosis of the disease and the appreciation of its period.

In diseases whose course is intermittent, each access presents a succession of phenomena, somewhat analogous to the three periods of an acute affection. Each of the component parts of the access,

viz., the chill, the flush and the sweating, is known by the name *stage* (*stadium*). The chill has been considered as the period of increase, the hot stage has been compared to the static period, and the sweating stage to the termination. Independently of the three stages presented by each paroxysm, the three periods of continued disease may occasionally be distinguished in the aggregate of the paroxysms. Thus, in the first week, the paroxysms progressively acquire a higher degree of intensity; then, for about the same space of time, they maintain a uniform intensity; a regular diminution, and finally, a spontaneous termination ensue. But in most cases, after a few recurrences of the paroxysm, we arrest the progress of the disease, and consequently, can no longer observe these modifications.

These periods are not observed exclusively in affections produced by internal causes, they are also evident in those resulting from external causes. In superficial wounds we first observe the divided parts becoming red, gradually swelling more and more, and discharging a sero-sanguinolent fluid: when the inflammation has become more intense, suppuration is established, and after some days the phlogosis diminishes, while at the same time the edges of the wound adhere, and the cicatrix is formed. In this series of phenomena we clearly distinguish an incremental, a static, and a declining, period; something analogous takes place in fracture, except that no purulent discharge exists, and that phosphate of lime is deposited in the tissue, originally cellular, afterwards cartilaginous, which unites the fragments.

In terminating this paragraph, it should be remarked, that, however distinct the periods may be, the transition from one to the other is almost always gradual and imperceptible, and that it is impossible to distinguish between the termination of one and the commencement of another.

§ IV. The circumstances capable of modifying the progress of diseases are very numerous. Youth and adult age, sanguineous or bilious temperament, and a strong constitution, hasten that progress and awaken a more lively reaction. The diurnal revolutions seem likewise to exert a very decided influence upon the course of diseases. Some of the ancient physicians thought that the four parts of the day might be compared to the four seasons of the year, viz: the morning to spring, mid-day to summer, the evening to autumn, the night to winter, and that each had an influence upon the exercise of the functions in health and disease, analogous to that of the seasons. *Testa*, who published a valuable work on the periods, inclined to this opinion, which should be admitted only with certain restrictions. Before sunrise, sweating is frequently observed, in both acute and chronic affections; at this period, absorption appears to be somewhat increased; œdema, when inconsiderable, disappears, and diminishes when excessive. It is at this time, as we have previously said, that we should employ absorbent remedies. *Cruikshank* assures us that venereal affec-

tions which resisted frictions employed in the evening or night, were cured by them when made in the morning. At sunrise, the signs of plethora are more decided than at any other time; the body is then more unwieldy and the head heavier: in some persons the fingers are so swollen that they can with difficulty be flexed; the degree of heat is often uncomfortable; at this time, also, the symptoms of cutaneous inflammation are usually more intense. The middle of the day induces a slight paroxysm in certain chronic affections, particularly in pulmonary phthisis, and some periodical pains return constantly at this hour. The evening is the most common season for exacerbations or paroxysms in most acute or chronic diseases; they persist and increase in intensity during the night, which usually has an unfavorable influence upon affections of a grave nature. Patients at this period, being fatigued by the impressions received during the day, experience more uneasiness; their pains, if any exist, become more severe; their attention is not easily arrested, and their memory is less sure than in the morning. It is almost always during the night that disorder of the intellectual functions begins to manifest itself; in some patients it reappears every evening, and ceases wholly during the day; in others, delirium, which is calm through the day, becomes furious in the night. During the night the countenance is usually more animated, the thirst increased, the tongue less moist or more parched, the respiration more accelerated, the pulse more frequent, the heat of the skin more elevated, and the urine of a deeper color.

Although the night may have an unfavorable influence upon the majority of diseases, there are many in which this is far more decided than in others; among these are affections of the heart and lungs (particularly emphysema, and pulmonary tubercle), rheumatic pains, etc. There are, indeed, certain affections, whose symptoms wholly disappear during the day, and manifest themselves only in the night; such are certain syphilitic pains and many eruptive diseases, as epinyctis. We have also seen a *morbilliform* eruption reappear every night for nearly a month, in an individual who retained no trace of it by day.

Some physicians have endeavored to discover the causes productive of these regular variations in the progress of diseases, which correspond to the diurnal revolutions. *M. Bally** asserts that light, or its absence, different degrees of temperature, and the unequal quantity of moisture diffused in the atmosphere, are the principal circumstances which determine the changes observed by day or night in the course of diseases. "Those manifesting themselves by exaltation of the vital forces, become aggravated in the daytime, those announced by prostration of the same forces, in the evening and night." This writer adds, in support of his opinion, that of eight cases of adynamic fever, seven terminated fatally between sunset and sunrise. If his opinion be correct as regards

* *De l'Influence de la Nuit, etc.* Thèses, 1807, No. 6.

affections of an adynamic type, it is far from being true in those of an opposite nature; daily experience will not allow us to admit that the paroxysms of inflammatory fevers, and of the phlegmasiæ, take place in the daytime; they are almost without exception observed in the night. Before concluding our remarks, in regard to the influence of the latter period upon the progress of diseases, we should draw attention to the fact that it is not always injurious, and that frequently during its course, the gentle and general sweats commence which announce the *arrest* (*détente*) of the disease, according to the common expression, and lead us to hope that a favorable termination is at hand.

The transient variations which occur in the temperature and moisture of the atmosphere, and in the direction of the winds, have but an uncertain influence upon the progress of chronic diseases, and seem to exert none whatever upon that of acute affections. A rapid change of temperature, however, especially sudden and severe cold, hastens the termination of chronic diseases which have attained their last stage. This is often observed in hospitals: when the temperature from having been for a long time mild, suddenly becomes very cold, the greater number of patients who, for many days, have been struggling with death, will succumb in from twenty-four to thirty hours. In hospitals allotted to old men, the disastrous effect of cold upon the moribund is still more evident; but the time of the *falling leaf*, so dreaded by the lower classes, is not generally more fatal to phthisical patients than the other seasons of the year, when sudden changes of temperature occur.

Many patients, more particularly those laboring under rheumatic and nervous affections, are persuaded that the intensity of their pains augments or diminishes under the influence of certain atmospheric conditions: many such persons believe they can accurately foretell the changes about to take place in the atmosphere, by the degree of severity of their pains; but observation does not usually confirm their assertions.

If the transitory changes supervening in the atmosphere have but little influence upon the course of diseases, it is far otherwise in regard to the important alterations arising from the succession of the seasons: their influence is well established and cannot be doubted. Thus, during winter, catarrhs and chronic discharges become more severe, pulmonary phthisis advances with greater rapidity, chronic rheumatism is more painful, dropsical effusion increases more rapidly, and œdema of the lower limbs appears in many patients who had never previously presented this symptom.

The influence of the heavenly bodies upon the course of diseases, is, in our climate at any rate, quite as obscure as their action considered in the light of a morbid cause. The rising of the Pleiades, the Dog-star and Arcturus, the equinoxes and solstices, in no degree alarm the modern physician, however respectable in other ways may be the authority which has pointed out the disastrous influence of these periods upon the course of diseases: this opinion, however, had several advocates in the times immediately preceding

our own. *Baillou*, in the first book of his treatise on Epidemics, relates the case of a patient who experienced, during an eclipse of the sun, an attack of syncope, which continued until the reappearance of that luminary. *Ramazzini* states, that in the night of the twenty-first of January (this was during the prevalence of epidemic petechial fever), when there was an eclipse of the moon, the greater part of the patients died, and almost at the very hour when the eclipse took place. "*Facta per noctem lunari eclipsi, major pars ægrotantium obiit, ac eâdem penè hora quâ nimirum luna laborabat.*" * *Balfour*, in Bengal, thought he could perceive that the moon had a physical action upon the progress of various diseases.† *Bruce* assures us that he has often noticed, in Sennaar, ‡ the influence of this planet upon epileptics; and the observations of *Fontana* support this assertion; but all that is known upon this point would not serve as foundation for a sound opinion. The same may be said in regard to the assertion of certain authors, Daquin in particular, that the moon has a positive and constant action upon the progress of insanity. M. Esquirol, indeed, has also observed that the insane were more excited at the period of full moon, but he convinced himself that this agitation was owing to the penetration of lunar light into their chambers, for complete exclusion of the light was sufficient to prevent the excitement.

Among those circumstances which influence the course of diseases, we should bear in mind the greater or less degree of salubrity of the patient's residence. Other things being equal, diseases are less severe and of shorter duration among isolated individuals; the contrary is true in crowded hospitals. This difference is readily perceived during an epidemic prevailing among all classes; the influence of this cause may be equally well appreciated by a comparison of the success of operations done upon isolated and upon hospital patients.

Climate and the aspect of the dwelling, have also a certain influence upon the course of diseases: we refer to our previous remarks upon climate and situation, considered as morbid causes.

The action of heat and cold upon the patient's body, the nature and quantity of the food and liquids taken, exercise and rest, very powerful sensations, agitation of mind, the passions, and nostalgia, are all causes capable of modifying the course of diseases, but productive of effects too various for general description.

In few diseases is the influence of these different agents so remarkable as in those of the heart. In these affections, the gravest symptoms, such as orthopnœa and infiltration of the limbs, are often observed to disappear several times before becoming permanently established: this retrograde course is more particularly noticed among poor hospital patients; in them, the development of these symptoms is often determined by errors in diet, but particularly by fatigue and watching, at a period when the organic lesion

* *Opera*. SYDENHAM, t. ii. p. 54.

† *Journ. de Médecine*, t. lxvii.

‡ *Voyage aux Sources du Nil*, t. viii. p. 4.

alone would not have produced them. By the simple removal of these causes, by rest and diet, the disease is reduced within its appropriate bounds, and the premature phenomena to which accidental circumstances had given rise, diminish and even disappear for a certain time; the affection returns to the second or even the first stage, after having apparently attained the third.

There is another condition which has so remarkable an influence upon the course of chronic diseases, that we cannot let it pass unnoticed; we mean the state of pregnancy. It not only causes the cessation of rheumatic and nervous affections, etc., but also seems to suspend the progress of the gravest organic diseases, even at an advanced stage. It is observed that phthisis often remains stationary in pregnant women; many of them survive the period of parturition and die shortly after.

Before commencing another subject, we would remark that the various circumstances which modify the course of diseases do not prevent their exhibiting a striking resemblance, not only in times and places nearly related, but also under very dissimilar conditions. When we read attentively the descriptions of disease by observing physicians of every age, from *Hippocrates* to our own times, we must inevitably recognise a great similarity between diseases observed in widely separated ages and countries; and notwithstanding the difference of climate, manners and other important circumstances capable of modifying them. *Baillou* and *Sydenham* in particular, have noticed epidemic fevers similar to those described by *Hippocrates* in the constitution of Thasus, and many descriptions by Aretæus of Cappadocia seem models of the diseases observed in our own times. — M.

CHAPTER IX.

DURATION OF DISEASES.

THE duration of diseases (*morbi mora*) is the period of time between their commencement and termination.

It is not always easy accurately to note the duration of a disease, from the difficulty of distinguishing the moment of invasion, and also the exact period of its termination; if there be the least uncertainty in respect to either of these two periods, the duration can only be approximately determined.

There is still another circumstance which renders this point in pathology still more obscure; we refer to the various modes employed by physicians in reckoning the days. Some physicians, with *Hippocrates*, reckoned the first day as terminating on the night following the attack, at whatever hour it may have been, and the following days as included between sunrise and sunset.

Others make the medical day to consist of twenty-four hours, each day of the disease commencing and terminating at the hour when the latter first made its appearance.

Diseases are extremely variable in their duration ; when lasting but one, or, at most, two or three days, they are called *ephemeral* ;* they are termed *acute*, when their duration is not over forty or sixty days ; *chronic*, when prolonged beyond that term. Ephemeral diseases have been divided into ephemeral, properly so called, which last but one day, and prolonged ephemeral, which extend to the second or third day. Acute diseases have been also subdivided into the *very acute* (*morbi acutissimi*), which present grave symptoms, and terminate favorably or unfavorably in three or four days ; *morbi subacutissimi vel peracuti*, which continue seven days ; *acute diseases, properly so called* (*morbi acuti*), whose duration is fourteen days ; and *subacute diseases* (*morbi subacuti*), which last from twenty-one to forty days. Chronic diseases have not undergone similar subdivision. These scholastic distinctions are no longer observed, and in the more modern schools are hardly understood, having no practical utility ; the division into acute and chronic diseases is the only one generally admitted.

The duration of diseases varies from a few moments to many years. Some fevers last but one day ; the Asiatic cholera has often terminated fatally in the course of a few hours ; there are certain hæmorrhages which last but a few minutes, and wounds of the heart or a large artery may cause instant death. Certain rheumatic affections terminate only with the life of the patient.

There are some diseases whose duration is fixed ; as rubeola, scarlatina and variola discreta, when occurring in healthy individuals ; the specific causes which produce them generally determine similar phenomena, succeeding each other in a certain order, and ceasing after a fixed time has elapsed. The duration of simple wounds and fractures, may be approximately calculated beforehand, according to the seat of the injury, age of the patient and some other circumstances. The duration of affections produced by internal causes is more variable ; that of pleurisy may terminate in three or four days or be prolonged to thirty, and even beyond, when it passes to the chronic state.

There are certain circumstances which exert a very marked influence upon the duration of diseases. Many affections continue longer after their second, than after their first, attack. A second ophthalmia commonly lasts longer than when it first appears ; the same is often true of blennorrhagia. This rule is by no means without exception, as it is not rare to observe a second peripneumonia, or a second attack of rheumatism, shorter than the first ; in the successive attacks of erysipelas, this disease diminishes in duration and severity.

The treatment and complications also exert a remarkable influence, as well upon the duration as the progress of diseases : these two points will be hereafter considered. — O.

* Εφημερος; επι, in ; ημερα, day.

CHAPTER X.

TERMINATION OF DISEASES.*

ARTICLE FIRST.

Different Modes of Termination. (Morborum eventus.)

THERE are some affections which continue through life and are not fatal to the patient; such are certain forms of paralysis and chronic rheumatism. Properly speaking, these affections have no termination; but it is otherwise with the majority of diseases, which terminate either in the return to health, in death, or in some other disease.

A. The *return to health*, or the *cure (morbi sanatio)*, consists in the complete restoration of all the functions. Its accompanying phenomena are exceedingly various, as are the diseases at whose close they are observed. Our inability to enumerate them all at present, compels us to review them generally, passing from the simplest to the most complex cases.

1. Among the diseases confined to one portion of the body, hæmorrhages and nervous pains are the most simple in their termination: the flow of blood is gradually or instantaneously arrested, the pain ceases, and the disease is at an end. The case is nearly the same in many other affections characterized by one predominant symptom, as spasmodic vomiting or nyctalopia: the gradual or rapid diminution of such a symptom, is the only phenomenon presented by the return to health. In the cure of the phlegmasiæ, the changes are more varied and numerous. Inflammation of the subcutaneous cellular tissue may serve as an example; in some cases, the pain, swelling, redness and heat disappear by degrees, in succession or simultaneously, and the inflamed part gradually regains its previous condition: this is called *resolution*. In other cases, there is purulent secretion, constituting *suppuration*; the enveloping tissues become thin, and finally allow the fluid to escape; in some rare cases, the tumor, at whatever stage of development it may be, not excepting that of evident fluctuation, suddenly disappears, leaving no trace of its existence, except flaccidity and wrinkling of the integuments: this is termed *repercussion (délitescence)*, and is a favorable mode of termination in inflammations produced by evident external causes, as burns of

* We shall add some considerations upon critical phenomena and critical days, to the account of the different terminations and principal forms of diseases.

the first degree, and contusions, but dangerous in those arising from internal causes. The phlegmasiæ occasionally terminate in *gangrene*, as is observed in furunculus and certain burns; in the former, a rounded eschar, the core, is discharged with the pus; in the latter, there is more or less extensive sloughing of the integuments; in both cases, the gangrenous portion is separated from the living parts by the pus effused between the latter and the eschar. Cicatrization gradually ensues, as in wounds with loss of substance.

2. In general constitutional affections, such as continued fever, pestilential diseases, eruptive fevers, etc., the return to health is rarely sudden: it is in some exceptional cases only, that in the midst of the most violent symptoms, a calm suddenly supervenes, which announces the approaching termination of the disease. The return to health is most frequently progressive, the functions gradually regain their healthy action, the countenance reassumes by degrees its natural expression, the evacuations are re-established, the skin becomes moist, the movements are more easily executed, and the patient feels himself improving daily. When the cure occurs by means of successive and distinct ameliorations, the patient experiences in the space of a few hours, (and often after the occurrence of phenomena which had not been previously observed, as perspiration or alvine evacuation,) a relief which apparently indicates incipient convalescence; but the symptoms, after a degree of mitigation, persist with the same intensity for several days, until a new amelioration occurs: usually, the second amelioration marks the commencement of actual convalescence; diseases have occasionally been observed to persist beyond this point with slighter symptoms, and to disappear only after a third or fourth effort.

General affections whose course is periodical, such as intermittent fevers, and those diseases known by the term *masked fevers*, sometimes terminate suddenly; but more frequently their paroxysms become irregular and incomplete, and the disease disappears gradually.

3. At the decline of local diseases which determine general functional derangement, the same phenomena which are manifested in local and general diseases are simultaneously observed. On one hand, peculiar changes occur in the affected organ; on the other, in the functions, whose disturbance was sympathetic. In pneumonia, for instance, the pain in the side ceases, the respiration becomes freer, the cough less frequent; the sputa, which were sanguinolent, are simply mucous, that part of the chest which returned a dull sound on percussion, regains its natural resonance, and instead of morbid sounds, we hear the gradually returning vesicular murmur; at the same time the face loses its flush, the thirst and frequency of pulse diminish, the heat is moderated, the skin is soft to the touch and often moist; the flow of urine is increased, appetite and strength return, etc. Such are the concomitant phenomena of recovery in the principal forms of acute disease.

In chronic diseases this termination is almost always progressive: the symptoms, after having increased for some time, diminish gradually, so that the transition from disease to a state of health, as well as its converse, is usually insensible: this is observed in discharges and catarrhs of a chronic nature, in old ulcers, scorbutus, etc. In certain cases, indeed, we observe chronic diseases come to a sudden termination, as in the disappearance of herpetic eruptions of long standing, the cessation of leucorrhœa, the prompt cicatrization of ulcers; but these rapid cures are very rare in chronic disease, and render us anxious in regard to possible sequelæ.

B. The termination *in death* takes place also in various ways, both in acute and chronic diseases.—In the former, it may sometimes occur suddenly, either from rapid sinking of the vital powers, as in abundant hæmorrhages, or before exhaustion has reached its extreme point, as observed in certain typhoid fevers and in some cases of confluent variola; it may also happen by a kind of asphyxia, or with cerebral symptoms, as convulsions and coma.—Death may, at other times, be announced many days previously to its occurrence, by a peculiar alteration of the countenance and an extreme feebleness in the motions and in the voice; the tongue becomes clammy or dry, deglutition is noisy, difficult or impossible; respiration frequent, unequal and rattling; the pulse small, weak, intermittent or insensible; the heat becomes gradually extinct from the extremities towards the trunk of the body; the body exhales a cadaverous odor, and is partially covered with a viscid and cold sweat; the excretions are involuntary, the sensations extinct; the patient differs only from a dead body by retaining the respiratory movements, which take place at intervals, until they cease entirely with life. This state, to which the term *agony** has been applied, may last for a few hours only, or be continued for many days, for one, or even several weeks; its usual duration is from twelve to twenty-four hours.—In other cases death is preceded and announced by many successive exacerbations in the symptoms. This exacerbation of the symptoms in each successive paroxysm, is particularly observed in malignant intermittent fevers.

In chronic diseases, the termination in death is rarely sudden; sometimes, however, this has been observed in cardiac aneurism, or in that of the larger arterial trunks, also in pulmonary phthisis and scorbutus; in all these cases death usually takes place by syncope: in chronic pleurisy, when pus is suddenly and profusely poured into the bronchial tubes, rapid death by asphyxia may ensue. But in most cases, death occurs in chronic diseases by progressive exhaustion of the vital energies, the patient being at one time reduced to the last degree of marasmus, at another, swollen by serous infiltration into the subcutaneous cellular tissue and effusion into the serous cavities. Many such patients retain their

* Ἀγων, a combat.

intellectual faculties and their appetite to the last; some sink by degrees, without pain or anxiety as to their fate; others, in the midst of the most excruciating bodily sufferings and the most frightful despair. The majority present, three or four days before death, a remarkable alteration of the countenance, a state of *collapse* and a leaden hue, which announce to the physician the approach of death.

C. Termination in *another disease* has been termed by the Greek physicians, *metaschematismus*,* an expression almost barbarous to our ears. Peculiar denominations have also been proposed, according to the actual transformation of the disease into another, or to the mere change of seat or form. In the first case, the change supervening in the kind or form of the disease, is called *diadoche* (*diadoxis*),† in the second, *metastasis*‡ (*metastasis*), the term *metaptosis* or *metastosis*§ has been employed in the former sense by some, in the latter, by others. *Metastasis* is the only term retained in our language, the others have become obsolete. Every displacement or transformation of disease is now called metastasis; the epithets *favorable* or *unfavorable* are added, according as the new affection is more or less severe than the former.

Metastasis takes place frequently in acute, but is more rare in chronic, diseases. Rheumatism often terminates by forsaking its original seat for an internal organ; the same is the case with hæmorrhages: this is metastasis, properly so called, that is, a simple change of seat or form, the disease remaining the same; while if a hæmorrhage or a cutaneous eruption succeed inflammation of the stomach or lungs, the disease which replaces the first is wholly different: this is the *diadoxis* of the ancients.

Chronic affections are sometimes observed to cease on the appearance of a cutaneous eruption or of continued or intermittent fever. M. Sabatier, in a very interesting thesis upon erysipelas,|| has shown by numerous cases collected at the Saint Louis Hospital, that this exanthema is occasionally followed either by definitive cure or by a very favorable change in the course of certain obstinate eruptions which resist nearly all curative means, as impetiginous eczema, sycosis labialis, mentagra, lichen, and even lupus and elephantiasis.

The transition of the same affection from the chronic to the acute state, and vice versa, has been referred to this mode of termination. But is not this a simple change in the course of a disease, rather than its termination in another? However this may be, the substitution of the acute for the chronic character in disease, sometimes effects a cure. It is not, indeed, uncommon to see

* Μετασχηματισμός, transformation or change of form, from σχῆμα, form, and μετά, signifying a change.

† Διαδοχή, succession; διαδέχομαι, I succeed.

‡ Μετάστασις, from μεταστέω, to transfer.

§ Μετέπεισις, change of event; from πτω, to happen, and μετα, signifying a change.

|| No. 209, 1831.

urethral discharges persist for months and even years, resisting every kind of treatment, and finally be wholly cured when the blennorrhea is rendered acute by the influence of some excess or by a new inoculation of the virus.

Diseases arising from internal or external causes, may terminate either in death or recovery, but the termination in another disease seems peculiar to those produced by internal causes; for the diseases which are owing to external causes and exclusively surgical, seem incapable of this mode of termination.

Such are the three modes of termination presented by diseases. Upon this point all medical observers are agreed; it is otherwise in regard to understanding and explaining the transition from disease to health. We here enter upon the domain of conjecture, and, from that moment, must expect to encounter the greatest diversity of opinion.

ARTICLE SECOND.

Doctrine of Crises.

§ I. THE term *crisis** has not been employed in medical language in a strictly uniform sense. *Hippocrates* declares crisis to be present when there is marked increase or diminution of the disease, when it degenerates into another, or when it entirely ceases.† Some authors apply this term only to the favorable or unfavorable changes supervening during the *static, or second period of the disease*; others make use of it to express a *rapid and favorable change* observed in connection with some *new evacuation*, or other *remarkable phenomenon*; others, finally, have given this name to the *phenomena accompanying the change*, and not to that change itself. The majority of modern physicians understand the term *crisis* in one of these latter acceptations, which is widely different from that given to it by *Hippocrates*.

Several varieties of crisis have been admitted; as salutary and fatal, regular and irregular, complete and incomplete. The *salutary* are those conducive of recovery; when prompt and preceded by exacerbation of the symptoms, they are crises properly so named; they have been designated by the term *lysis*‡ (*solutio*), when mild and unannounced by previous exacerbation. *Regular* crises are those ushered in by precursory signs, which occur on certain foreseen days, and are accompanied by critical phenomena; *irregular* crises do not present these conditions. *Complete* crises

* *Est vox hæc, crisis, judicium, ἀπὸ τοῦ κρίνεται, desumpta a foro judiciali, quia inter spem vitæ metumque mortis ancipites tunc ægri trepidant, veluti rei coram judice; incerti plane, utrum crimine absolvendi sint, an morte dammandi.* (Prælect. Ant. DEHAEN in Boerhaave. *Inst. Path.* t. ii. p. 287.)

† *Lib. de Affection.* LINDEN, ii. p. 165.

‡ *Λύσις, solution; from λύω, I dissolve.*

are those which decide the termination of the disease, by recovery or death; the *incomplete* leave the patient in a doubtful state.

The real object of discussion has been the existence of critical phenomena, not that of crises. Every one admits changes of favorable or unfavorable nature in disease, and the transformation of one malady into another; this we have seen to be the definition of the term crisis as used by *Hippocrates*, but it is otherwise with the accompanying phenomena of crisis; great difference of opinion exists in regard to their frequency and influence upon the termination of diseases. Before examining these two questions, we must enumerate the phenomena themselves, and point out their antecedent and accompanying signs and the circumstances favorable to their production.

A. Critical phenomena may be manifested in various parts. They are most frequently observed upon the mucous surfaces; next in frequency is the skin, thirdly the glands, afterwards the cellular tissue and serous membranes; some of them may also occur in the nervous system.*

1. The mucous surfaces present certain critical exhalations and eruptions.

The critical exhalations from the mucous surfaces are of several varieties; the natural exhalation may be increased, or may become an accidental sanguineous or aqueous exhalation. The mucous secretion of the nasal fossæ, pharynx and bronchial tubes is sometimes augmented toward the close of diseases; mucous stools, and, occasionally, emesis of glairy matters have been observed at such periods; not unfrequently there is a similar deposit in the urine.—Sanguineous exhalations from the mucous surfaces, as epistaxis, hæmorrhoidal flux and metrorrhagia have often been observed under the above conditions, and considered as critical phenomena. But few instances of aqueous exhalation from the mucous surfaces have been recorded; aqueous emesis and catharsis have been mentioned, as being apparently critical of dropsy.

One species only of critical eruption has been observed upon the mucous surfaces; this is the aphthous eruption which occasionally supervenes in the last stage of acute diseases, especially in children.

2. The skin likewise presents exhalations and eruptions regarded as critical. In the latter stage of many acute diseases, pneumonia particularly, a general perspiration supervenes, which is the more remarkable from the fact, that during the first two periods the skin often remains dry; at other times there is only slight moisture apparent.—The eruptions observed upon the skin toward the termination of acute or chronic diseases, are very numerous. Erysipelas, furunculus, different species of erythema or herpes are the principal; the latter is most frequently seen upon

* Dr. Copland differs from our author in his enumeration of critical phenomena, in regard to their frequency of seat. He states them to occur, 1st, on the skin; 2dly, in the cellular tissue; 3dly, in the glands; 4thly, on the mucous surfaces. (Med. Dict. Art. Crisis) — TRANS.

the lips; pemphigus occasionally appears at the same period; *Storck** and *Morgagni*† have related some very remarkable examples. The abundant purulent exhalation produced by vesication, and critical icterus, have been placed in the same category, although the latter is more appropriately classed elsewhere.

3. The critical phenomena exhibited by the glandular organs may consist in an increase of secretion, or in tumefaction of the glands themselves. Salivation was noticed by *Sydenham* as a critical evacuation in certain affections; bilious stools and abundant flow of sedimentary urine are quite frequent phenomena at the decline of diseases. The lacteal secretion, as we have previously seen, is critical of milk fever.—Tumefaction of the parotids sometimes supervenes on the decline of malignant fevers. Swelling of the conglobate glands of the groin or axilla has been considered as critical by many physicians who have observed and described the plague; but, in many of these cases, has not a tardily developed symptom been mistaken for a critical phenomenon?

4. The same may be remarked of the œdematous swelling of the cellular tissue, mentioned by *Sydenham* as a critical phenomenon in intermittent fever.‡ Subcutaneous abscess has also seemed critical of certain diseases.—Simple inflammatory swelling of the cellular tissue has been regarded as critical in certain cases, although suppuration might not have taken place; at the decline of fevers a peculiar tumefaction of the extremitities, the face and even of the whole body, without evident signs of inflammation, has been observed.—Gangrene of the cellular tissue and integuments has been ranked by some authors among the critical phenomena of adynamic fevers.

5. The critical phenomena manifested by the serous membranes are almost always unfavorable. Occasionally there is dropsy, sometimes sanguineous effusion supervening on the decline of another disease. The same is the case with synovial effusion into articular cavities.

6. Finally, the nervous system has sometimes furnished critical phenomena; a sharp pain in the course of a nerve, paralysis, or convulsion of a portion of the body, loss of a sense, as hearing, sight or smell, and even disturbance of the intellectual functions have been observed towards the termination of diseases,§ and regarded as critical.

B. Of the signs which precede and accompany critical phenom-

* *Annus Medicus*, ii. p. 112. “*Unicus fuit æger in quo hæc materies intra scapulas colligebatur, et fiebat ibi tumor qui magnitudine caput virile excessit; aperto tumore, novem libra seri flavi viscidî effluerunt.*”

† *De Sedibus et Causis*. Lib. iv. art. 7.

‡ *Opera omnia*, t. i. p. 60.

§ In certain circumstances, violent emotion has arrested the progress of an obstinate disease, as an intermittent fever or a convulsive affection. Sleep has also seemed to banish very severe pains which had continued for many hours. But admitting sleep to be a critical phenomenon, it is very certain that strong emotions, disconnected with the disease, cannot be so considered.

ena, there are some which are common to all : there are others peculiar to each.

The *common precursory signs* are pain, more or less severe, often, simple pruritus, heat or a sense of weight in the organ about to become the seat of the critical phenomena ; to these may be added a notable increase of the general symptoms of the disease, especially the force and frequency of the pulse. The *usual concomitant signs* of critical phenomena are a sensation of amendment, more or less decided, and a perceptible diminution in most of the symptoms.

Critical phenomena are not always announced by peculiar signs ; those which present them most frequently, are the alvine evacuations, hæmorrhages, the urine and the sweat.

The signs preceding alvine discharges are borborygmi, colic, distension of the abdomen, eructation and flatulence, a sense of tension in the lumbar region, pains in the thighs and knees, and a somewhat irregular pulse. The evacuation takes place without pain ; it is copious, homogeneous, of a yellow or brownish color, pultaceous and, sometimes, mucous.

Critical epistaxis is usually announced by redness, with slight tumefaction of the face and eyes ; occasionally the redness and swelling are limited to one of the alæ nasi, the one corresponding to the nostril whence the blood will flow. A dull pain in the forehead, at the root of the nose or at the nape of the neck, throbbing of the temporal arteries, tinnitus aurium, deafness, luminous spectra, involuntary tears, and, in certain patients, slight delirium or somnolency, precede epistaxis. A quick, hard pulse and frequent respiration have sometimes announced this phenomenon ; epistaxis should be copious to be termed critical.

Hæmoptysis is preceded by a sensation of heat in the chest, and by embarrassed respiration.

The signs indicative of hæmatemesis are præcordial anxiety, eructations, and all the precursory phenomena of vomiting. Hæmatemesis and hæmoptysis, as also hæmaturia, are almost always unfavorable critical phenomena.

The hæmorrhoidal flux is announced by pain and sense of weight about the sacrum, tenesmus, and sometimes dysuria. The same precursory signs belong to metrorrhagia, with occasional augmentation or diminution in volume of the mammæ, hypogastric colic, and, for each female individually, the addition of the phenomena usually preceding her menstrual periods ; these vary in different persons.

Critical diuresis is preceded by a sense of weight in the hypochondria, dull tension in the hypogastrium, titillation in the urinary organs, and diminution of cutaneous exhalation ; frequent excretion of urine afterwards takes place ; it is copious, usually high colored when cool, and deposits a cohesive, homogeneous, white or rose colored sediment. The addition of nitric acid sometimes throws down a white, abundant, albuminous precipitate.

Sweating is frequently preceded by slight chills, diminished

urinary and fæcal excretion, and occasionally by flushing of the face; the elevation of the hypochondria and slight pruritus of the cutaneous surface have been mentioned as signs of this phenomenon. We have not enumerated, among these various signs, the alterations in the pulse peculiar to each kind of crisis, because experience has not confirmed the ingenious assertions of *Solano* and his followers. Physicians have also been as prompt in abandoning, as they were ready to admit, the doctrine of critical pulse.*

* *Bordeu*, the most celebrated historian of critical pulse, divided the pulse into *irritative* or *non-critical*, which is contracted, sharp, hard, dry and quick; and into *critical* pulse, which is bounding, full, strong, frequent and often unequal. The latter is met with in the third period of diseases, the former in the first. The critical pulse is divided into superior and inferior: the former indicates that the crisis will take place by some organ situated above the diaphragm; the latter, that it will occur in one below it.

"The superior pulse is remarkable for a rapid reduplication of the arterial pulsations: this reduplication, which is its essential constituent, seems originally to be but a single pulsation; it is liable to intervals from time to time; these are longer or shorter, more or less frequent, according to the nature or degree of the disease. Dilatation, usually effected in one, occupies two beats, and there are two sensible efforts succeeding a natural contraction of the artery.

"The *inferior* pulse is irregular, that is, its pulsations and intervals are unequal: the intervals are sometimes so considerable as to constitute actual intermittence, according to the kind of inferior pulse and in proportion as it may be more or less marked. A sort of leaping of the artery is sometimes noticed, which serves in some degree to characterize this species of pulse.

"The superior and inferior pulse may be simple, compound or complicated: they are *simple* when they indicate the approach of crisis by a single organ; *compound*, when the critical effort is about to be manifested in several at once; *complicated*, when they are united at intervals with the irritative pulse, during which time the critical effort seems interrupted."

The different characteristics of the simple pulse are as follows:

SUPERIOR PULSE.

1. *Pectoral*. "This is soft, full, dilated; its pulsations equal; in each of them a sort of undulation is noticed, that is, the dilatation of the artery takes place in two beats, but with an ease, softness and gentle oscillatory force, which do not allow us to confound this kind of pulse with the others."

2. *Guttural*. "Strong, with redoubling of each beat; less soft and full, often more frequent, than the pectoral, it is apparently intermediate between it and the nasal pulse."

3. *Nasal*. "Redoubled beat like the guttural, but fuller and harder; much stronger and quicker."

INFERIOR PULSE.

1. *Stomachal*. "Announces vomiting, and is the least developed of all the varieties of critical pulse: it is less unequal than any of the kinds of inferior pulse; the artery seems to stiffen and tremble beneath the finger; it is often somewhat leaping in character; the pulsations are frequent, and take place at moderately equal intervals."

2. *Intestinal*. "More developed than the former; the pulsations quite strong, as if rounded, and above all, unequal, as well in their force as in their interval, which is very easily distinguished, since it happens almost constantly, that after two or three quite equal and elevated pulsations, there occur two or three less developed, less prompt, nearer together, and as if communicating with each other; from this results a sort of leaping or convulsive effort (*'explosion de l'artère'*) of the artery, of greater or less regularity: to the irregularities of this pulse very

The other critical phenomena have not, generally speaking, peculiar precursory signs; in those cases only where critical abscess terminates a disease, the urine is sometimes observed to remain clear, and transient chills and partial sweats are noticed at the decline of the disease.*

At one time a single critical phenomenon only is observed, as copious hæmorrhage or profuse sweating; at another, many are

remarkable intermittence is often added. It is never so full and developed as the superior pulse: its intermittence does not necessarily follow a definite order, on the contrary, its disorder renders it easy of recognition."

3. *Uterine*. "Usually more elevated and more developed than the natural pulse: its pulsations unequal; the rebounding character is, it is true, less constant, less frequent and decided than in the nasal pulse, but is still sufficiently perceptible."

4. *Hepatic*. "The most concentrated after the stomachal; neither hard nor resistant; unequal, its inequality consisting in the succession of three or four unequal pulsations to the same number perfectly equal, and which often appear natural."

5. *Hæmorrhoidal*. "Unequal, like the other species of inferior pulse; but the inequality is peculiar to it. The pulsations have little similarity in force, and still less as to interval. When less unequal, they seem almost always to belong to the state of irritation: there are, however, occasionally, some which are fuller, and in which the contracted character is not so perceptible: when more dilated, they are soon followed by a rebounding pulse. Three or four rather concentrated pulsations, sharp, resistant and nearly equal, are succeeded by two or three somewhat dilated, as if rounded and less equal; the three or four following pulsations are rebounding in their character; but these different pulsations have this in common, that there constantly exists a sort of tremor, greater frequency and depth of contraction than in the other varieties of inferior pulse: a depth, so to speak, is perceived in the pulsations, which, with the tremor, is the most distinguishing characteristic between the uterine and hæmorrhoidal pulse."

6. *Urinal*. "Unequal, with a sort of regularity: there are several pulsations gradually diminishing in force even to the point, we might almost say, of disappearing beneath the finger, and recurring in the same order from time to time: the pulsations in the intervals are more developed, sufficiently equal and slightly leaping in their character."

Sudatory. "When the pulse is full, pliant, developed, and strong; when in addition to these modifications, the pulsations become unequal; when they increase to the last, which is distinguished by a dilatation and at the same time by a more decided suppleness than in the other pulsations, a critical sweat should always be expected."

* *Hippocrates* assures us that when the urine continues transparent and crude for a long time, other signs being favorable, we should suspect abscess in some of the organs below the diaphragm. (*Prænot*, No. 78, *Foës*). The case of *Pthion*, related by *Hippocrates* in the third book of his *Epidemics*, is not the only one confirmatory of this assertion, however extraordinary it may appear. *Tissot* has given us another in his description of the bilious fever of Lausanne, and we have ourselves seen a similar case in a patient at La Charité. He was affected with peripneumonia, in the latter stage of which the urine remained constantly transparent, after all the symptoms had completely disappeared. He seemed convalescent, when upon the seventeenth day there supervened severe pain in the left leg. On the nineteenth day, this pain became throbbing in its character and remarkable tumefaction and hardness were added. Afterwards, the pain and swelling increased and extended to the thigh; but on the fifth day, the urine, hitherto transparent, became turbid and ammoniacal, and the inflammation, which threatened suppuration, terminated promptly in resolution.

met with simultaneously; in certain cases, all the *colatoria* seem open at once; the skin is covered with sweat, there is profuse flow of urine, the bowels become relaxed, the mucous secretion of the nasal fossæ and of the air passages is increased, etc. At other times, various critical phenomena take place, but successively.

C. Critical phenomena are not in all circumstances equally evident. They are more distinct and frequent in youth and infancy, in persons of strong constitution, in temperate climates, in elevated situations, and in the spring of the year; they are more obscure in the diseases of the aged, in feeble constitutions, in moist situations, and under the influence of an active treatment. *Baglivi* asserted that they were less frequent among the inhabitants of cities than among those of the country; and others have noticed their greater frequency in the higher classes.

There are certain circumstances favorable to the production of particular critical phenomena. Critical hæmorrhage is more frequent in the spring and in dry summers, in fertile countries, and in those of sanguine temperament who are subject, when in health, to habitual hæmorrhage; it is chiefly observed from the age of fifteen to thirty-five. Exhalation from the mucous surfaces takes place especially in those of lymphatic temperament, in wet seasons, as autumn and winter, and in low and marshy grounds. Critical diarrhœa has seemed to be more frequent in adults of bilious temperament, and in autumn; critical diuresis, in the lymphatic, has been more often noticed in winter and spring.

If the reports of some distinguished physicians may be credited, it would seem that each country imparts to disease a peculiar tendency to certain critical phenomena. *Coray*, in his erudite notes to the treatise upon the atmosphere, water, and regions, assures us that critical sweats are more frequent in Italy and in warm countries generally; that in Holland and England, urinary deposits are quite common; that in western France the miliary eruption is more frequently critical of diseases, while at Paris critical phenomena would be more varied.

It has been thought that there are some critical phenomena which more especially belong to diseases of certain cavities. *M. Voisin*, in a thesis read before the Parisian Faculty of Medicine, asserts that thoracic affections terminate most frequently by critical phenomena which are manifested upon the cutaneous surface, while cerebral affections usually terminate by alvine evacuations. This opinion, founded upon a certain number of observations and upon the sympathy which exists between the lungs and the skin, and between the head and the abdomen, demands the attention of medical observers.

D. The duration of critical phenomena is variable; the majority persist for twelve or twenty-four hours only; critical diaphoresis and diuresis usually continue into convalescence, and their unseasonable suppression often induces recurrence of the disease.

Hæmorrhages sometimes continue for a few minutes only, while certain eruptions appearing at the decline of diseases, have persisted, in some cases, for several months.

If, after the enumeration of these various phenomena, cited by authors as critical, we would determine to what extent they deserve this appellation, we are compelled first to examine their frequency, and afterwards their influence upon the course of diseases.

There is great difference of opinion among writers upon this subject; and, first, in regard to the frequency of critical phenomena; some asserting them to be exceedingly rare; others, that they are constantly present whenever treatment or a deteriorated constitution do not prevent. Authorities and arguments have been accumulated on all sides, in order to solve a question which facts alone can decide; the numerous essays published upon this subject have only rendered the proposed end more remote. We do not pretend to decide a question so long disputed, but shall confine ourselves to the simple exposition of the result of our observations and reflections.

We remark, in the first place, that this question does not seem to us so important as it has been considered, and the neglect into which it has now fallen, confirms, to a certain extent, this opinion. However this may be, the following is our opinion in reference to the frequency of critical phenomena. In very many acute diseases, and especially in inflammations of moderate intensity, we are not in the habit of employing any of those active means which have been regarded as peculiarly suited to prevent the development of critical phenomena, and we are compelled to state that in an immense majority of cases, we have seen these diseases cured without any signification of their resolution by remarkable phenomena; we cannot consider a slight moisture, more abundant or more loaded urine, or certain alvine evacuations, as critical phenomena; we regard them as such only when they draw the attention by something unusual in their nature or intensity, something, in short, which distinguishes them from the common symptoms of these diseases. It is, however, in exceptional cases only, that such phenomena have been observed, and in a great majority of cases, whatever may have been the treatment, the diseases have seemed to us to terminate favorably or unfavorably without critical phenomena of importance.

In regard to the second question, which refers to the influence exerted by critical phenomena upon the result of diseases, a majority of the old writers considered these phenomena the cause of the re-establishment of the functions; * that the morbid matter, properly elaborated, was excreted with the urine, the sweat, the fæces, etc., and that the disease terminated in this manner by the elimination of its productive and continuing cause. This opinion has

* Critical phenomena may also correspond to an exacerbation of symptoms, or even to the death of the patients; but the term is usually employed in a favorable sense.

been, latterly, disputed by very distinguished physicians, who have considered the phenomena occurring at such times as the simple effect of the re-establishment of functions previously disturbed or suspended. We shall point out the principal reasons in favor of these two conjectures.

Those who see in critical phenomena, and especially in critical evacuations, the cause of re-established health, offer many arguments in support of their opinion. 1. According to them, the *epoch*, at which these phenomena appear, proves that they are the actual cause of the return to health, since they often precede amendment, and are, in many cases, announced by peculiar signs, while the disease is yet at its height. 2. The relief which succeeds these critical phenomena, and the reappearance of the disease when they are unseasonably suppressed, favor the above opinion. 3. These phenomena cannot be considered the effect of the re-establishment of the functions, if we remember that they differ very much from those presented during health: the evacuations at the termination of disease are never similar to those of health: the urine contains sediment; the copious and general sweats exhale a peculiar odor; the fæces are abundant and pultaceous, etc. 4. Can hæmorrhage, abscess, pustules and apthæ, supervening on the decline of acute diseases, be considered as the effect of the re-establishment of the functions alone? Assuredly, there is here something more than the cessation of morbid phenomena. 5. If these various proofs, united, were still insufficient, it cannot be denied that the occurrence of the catamenia, during the fever preceding their first appearance, and the secretion of milk, in that following parturition, are, incontestibly, the causes which arrest the functional disturbance. 6. If, in certain cases, the course of nature is obscure, (add the partisans of this doctrine,) such are not the circumstances suitable for its study: when the veil that shrouds it is less impenetrable, the mechanism of its action may be detected.

Those who have considered the phenomena occurring at the decline of diseases, as the effect, and not the cause of the return to health, found their opinion upon arguments of considerable plausibility: 1. The phenomena termed critical are generally observed in one class of diseases only, viz. the acute diseases: moreover, it most frequently happens that they are wanting, as is proved by the statements of even *Hippocrates* and *Forestus*, which are cited by the partisans of crisis: but if these phenomena were essential to the termination of the disease, would they not be of constant occurrence? 2. The so called critical phenomena do not always appear previous to or at the same time with the amendment; they often succeed it, and must then be considered the effect, and by no means the cause, of the change which has supervened. The precursory signs which announce these phenomena, besides being of very rare occurrence, do not prove them to be actually critical: delirium, which is but a symptom of disease, has its own precursory signs. 3. The same phenomenon which may be considered unfavorable or valueless in one case, is regarded as favor-

able in another, and this at different periods in the same individual: the sweats, for example, which take place throughout the disease, are considered unfavorable during the first, indifferent during the second, and useful in the third stage; is it not more natural to admit that they are, in all the periods, but one of the symptoms of the disease, and not a phenomenon distinct from the others and capable of modifying its course? 4. Most of the critical evacuations differ very little from the natural: if some exhibit a greater dissimilarity, the difference should doubtless be attributed to the former malady, and to the still existing disturbance of the functions, which only gradually recover their complete regularity. 5. In regard to diseases which appear at the instant when others terminate, as unusual hæmorrhage, exanthemata, etc., it may happen, either that the appearance of the one class and the cessation of the other are only a coincidence, or that the first of these phenomena may be the cause of the second. Supposing the latter proposition to be true, it would be proved that one disease might suspend another; but would that prove that the sweats, the sedimentary urine, etc., produce a similar effect? 6. If relief follow the appearance of *critical evacuations*, and if the exacerbation or return of the symptoms be produced by their suppression, they are not thereby proved to be the cause of this change. Suppression of natural evacuations, may excite in a healthy person the development of any disease whatever; is it surprising that the same cause should produce analogous effects in one who is debilitated, and cause recurrence of an affection but just terminated?

By an impartial examination of all the circumstances which favor these two opposite opinions, we see how difficult it is, if we would not decide hastily, to adopt the one and reject the other. The partisans of critical phenomena will always cite, in support of their doctrine, the lacteal secretion, which, in the newly delivered, seems, indeed, the cause to which the cessation of the antecedent fever must be ascribed; but if we afterwards consider the course of reasoning, and the facts upon which the contrary opinion is founded, its entire rejection will be found difficult.

The insufficiency of each of these theories might perhaps lead to their reconciliation, although they are in complete opposition. If we observe the various resources of nature, and how rarely she is limited to an exactly uniform course, we might be induced to think that the same phenomena are at one time the effect, and at another, the cause, of the re-establishment of the functions. It is even possible that the phenomena observed at the declining period of diseases may have relations with those preceding and succeeding them, which escape our observation. We should not be hasty in drawing general conclusions, still less so, in assigning bounds to the powers of nature.

Crises, in Hippocratic language, being only remarkable changes, either favorable or unfavorable, supervening in the course of diseases, their existence cannot be doubted.

This is not the case with critical phenomena, whose influence

upon the termination of the disease, is, and always will be, exceedingly obscure.

In some few cases, these phenomena seem to play an active part in the resolution of the disease; analogy would lead us to suppose that the same might be true in many other cases, where their influence is less evident.

The greater number of acute diseases, however, terminate without critical phenomena, and the phenomena which have been dignified with this name, are, for the most part, nothing but new diseases, which have supervened upon the decline of the first, or the tardily developed symptoms of the original disease, or lastly, the simple effect of the re-establishment of previously suspended secretions.

ARTICLE THIRD.

Doctrine of Critical Days.

Do crises, that is, the favorable or unfavorable alterations supervening in the course of diseases, take place exclusively, or particularly, on certain days, or indifferently upon any? Are there, or not, critical days?

This doctrinal point has long been a permanent topic for controversy in the schools. Its partisans and their opponents have been drawn, as is almost always the case, by the heat of debate, beyond the point which they wished to defend or attack. The former have thus been led to assert that disease could not be terminated except on certain days, while the latter maintain that no disease whatever is restricted in its termination to any particular day.

The following is the doctrine of *Hippocrates* in reference to critical days.

He regarded the latter days of each week, or period of seven days, as most favorable to the changes which occur in disease. These days are the 7th, 14th, 20th, 27th, 34th, and 40th: he termed them *critical days*. Counting in this manner, the third septenary period commenced upon the last day of the second, that is, the 14th day; the sixth week commenced upon the last day of the fifth, or the 34th; so that three periods, of seven days each, consisted of only twenty days, and six periods comprised but forty days. *Hippocrates*, therefore, reckoned twenty-one medical days in twenty solar days. *Chesneau*, in his *Treatise on Fever*, proposed a medical day of twenty-three hours; but this would not be exactly that of *Hippocrates*, which is somewhat shorter.

Hippocrates placed those days which occur in the middle of the septenary periods, in the second rank, as the 4th, 11th, and 17th; he named them *indicatory*, because, in his opinion, the alterations are rather *indicated* than declared, upon those days: they are indicated either by some new phenomenon, or by diminished or augmented intensity of the disease.

The remaining days were divided into intercalary, upon which the crises happen less frequently, and are less complete than upon the critical and indicatory days, and into vacant or non-decretory days, upon which crisis rarely occurs. The days appertaining to each of these four series are as follows:—

Critical days, 7th, 14th, 20th, 27th, 34th, 40th, 60th, etc.

Indicatory days, 4th, 11th, 17th, 24th, etc.

Intercalary days, 3d, 5th, 6th, 9th, etc.

Non-decretory days, 2d, 8th, 10th, 12th, 13th, 15th.

Our idea of the doctrine of *Hippocrates* upon critical days would be incorrect did we consider it as exclusive. This great physician had the wisdom to offer nothing upon this subject as being of constant occurrence; he supposed that the course of diseases was modified according to season and epidemics. The observations recorded in his works are not always conformed to his general axioms upon critical days, and this alone would prove that he admitted exceptions. He also thought that crises might be advanced or retarded a day, taking place, for instance, upon the 6th, or even the 8th, which is a *non-decretory* day, instead of on the seventh.

Galen and his followers were far from imitating the circumspection of the father of medicine; they disfigured his theory by asserting that certain days were constantly favorable, and others always unfavorable; so that no disease could terminate unfavorably upon the 7th day, nor favorably upon the 6th. Upon this subject *Galen* calls to witness the immortal gods, who, says he, know the truth of my words!

It is as easy to refute the exclusive assertions of *Galen*, as it is difficult to combat the reserved doctrine of *Hippocrates*. If there be a certain number of affections, which may terminate indifferently at any period, there are many others whose cessation, in a fixed time, is constant, and which have, as has been remarked, a kind of maturity comparable to that of the vegetables; variola and typhus, particularly, are of this class. Of forty-eight cases of grave fever recorded by *Forestus*, thirty terminated upon critical days, eight upon indicatory days, and ten only upon the vacant or intercalary days. By collecting all the observations scattered through the works of *Hippocrates*, *Dehaen* has shown that in one hundred and sixty-five cases of acute disease, one hundred and sixteen complete or incomplete crises took place upon critical, or indicatory days, and seventy-seven only, upon other days. Favorable crises have occurred most frequently upon critical or indicatory days, the unfavorable, upon intercalary, or vacant days.*

This influence of the critical days is not evident in internal diseases alone; it would seem from the observations of *Testa*, that it extends, in a certain degree, to surgical affections. According to this author, it is usually upon the 4th, 7th, 11th, 14th, or 20th days that remarkable alterations take place in wounds, that ab-

* *DEHAEN, Praelect: in Boerhaave. Inst. Path. t. ii. p. 276.*

cess discharges itself, that favorable evacuations, and the accidents of disease, particularly convulsions, supervene.

The opponents of the doctrine of critical days have asserted that it was not observation which led *Hippocrates* to its establishment, but that he was prejudiced in favor of the numerical system of *Pythagoras*. *Celsus*, in particular, thus indirectly reproaches *Hippocrates*, when he accuses *the old physicians of having referred the periods of disease, and the critical days, to the power of numbers*. When we reflect upon the circumspection with which *Hippocrates* expresses himself in regard to the influence of critical days, we find it difficult to reconcile language so reserved with such a prejudice as has been mentioned. If we compare the numerical doctrine of *Pythagoras* with that of the critical days of *Hippocrates*, we shall be still more convinced that the latter was not blinded by *Pythagorism*. The attentive perusal of the writings of *Hippocrates* does not allow us to suppose that he attached so much importance to numbers in general, and to unequal numbers in particular, as has been generally believed. The doctrine of critical days, as presented in his authenticated works, is so different from that contained in the books incorrectly attributed to him, that it becomes concurrent proof in showing the slight foundation that exists for the distinction which has been made.

We shall not go so far as to assert that the researches of *Hippocrates* upon critical days are wholly foreign to the system of *Pythagoras*; but it is another thing that this system suggested to *Hippocrates* the idea of critical days, or that this physician was led by that system to observe them; if, therefore, it be proved that the numerical doctrine, and that of critical days, although to a certain extent analogous, differ in many respects; if, as would be easy to show, they are, in many points, in complete opposition, it cannot be admitted that the doctrine of critical days is only the application of the system of *Pythagoras* to the course of diseases, and we are forced to the conclusion that *Hippocrates* relied mainly upon his own observations in announcing a doctrine, the idea of which might have been suggested to him by the numerical system.

Most of the discussions which have arisen concerning critical days, might have been avoided if the point in debate had been better understood, and each disputant had clearly expressed to what extent he wished to question or defend this opinion. Almost all these partisans willingly agreed that diseases did not undergo resolution in every case, without exception, upon critical, or indicatory days, and, very probably, the majority of their opponents would have admitted that there are certain days upon which the changes in diseases are somewhat more frequent; from that moment the question would no longer have turned upon the relative frequency, and the observations subsequently made, with the intention of elucidating this latter point, would have had at least the advantage of enriching the annals of science, even if they left this question undecided; for it is peculiar to exact observations, that, even when they fail to attain the observer's object, they remain

forever, useful monuments for consultation, and suitable aids in the solution of the questions daily arising by reason of the progress of medicine.

Before terminating this article, we would remark that the doctrine of critical phenomena, and that of critical days, are, to a certain extent, independent, and that one may be well founded, and the other not.

In conclusion, we would add, that the doctrine of critical days, like that of critical phenomena, does not possess the importance which has been attributed to it; that the difficulty of fixing the days of the invasion and termination of diseases, renders it inapplicable in many cases, and that it allows both the adherents and antagonists of this theory to interpret the same facts to their advantage. — M.

CHAPTER XI.

CONVALESCENCE.

CONVALESCENCE (*convalescentia*) is an intermediate state between disease, which no longer exists, and health, still unrestored: it commences when the characteristic symptoms of the disease have disappeared, and terminates at the period when that free and regular functional action, constituting health, is fully re-established.

The term *convalescence* consequently supposes a certain degree of gravity in the antecedent disease. After simple indisposition, or the cure of certain local affections, there is no convalescence.

Convalescence has been divided into the real and the fallacious: this division cannot be admitted. If disease persist after a marked remission, the individual is yet ill; if it have ceased, he is convalescent. Convalescence may be uncertain, but is never fallacious.

The phenomena of convalescence necessarily vary, like those of the antecedent disease. They have, however, certain points in common, both in acute and chronic affections.

In the latter, the slowness with which the re-establishment of the functions takes place, constitutes the principal character of convalescence: the countenance long retains the impression of disease; the healthy standard, as regards flesh and strength, is not regained for several months; the appetite languishes for a long time, the stomach and intestines are inactive. An entire year often elapses before complete recovery is attained; and in certain persons, especially those of advanced age, the system experiences, for an indefinite period, the effects of the powerful shock it has received.

The phenomena which accompany convalescence from acute disease, are far more numerous and remarkable. One of the first

effects of the cessation of disease is a rapid emaciation of the whole body, particularly of the face, which becomes paler. This emaciation and pallor seem especially connected with the cessation of the febrile action, and with the diminution of heat; for even in the living body, heat determines an increase of volume in its constituent parts, an actual rarefaction of the solids and fluids; the re-establishment of the secretions during the third period, has also a certain influence in diminishing the volume of the body. At the same time that the convalescent experiences relief from the cessation of his pain or uneasiness, his loss of strength becomes more evident: it is with tottering steps and great effort that he first attempts to walk; his voice remains for some time feeble, and regains by degrees only, its natural tone. This prostration extends likewise to the intellectual faculties: imagination, memory and judgment, it is true, are freely exercised by the majority of individuals; but violent mental exercise induces instant fatigue, headache or other morbid phenomena. It is also observed that the convalescent state is accompanied by remarkable increase of the nervous susceptibility; convalescents, although inclined to agreeable thoughts, are impatient and irascible, and physical and moral impressions often cause them a shock out of proportion to the determining cause and the usual impressibility of the patients.

The regular action of the digestive functions is but gradually resumed; the tongue continues slightly coated, appetite does not always return promptly; wine often has a bitter taste, and bread is tasteless; thirst diminishes or ceases; in the majority of cases, appetite returns more quickly than the powers of digestion, and this is the cause of the attacks of indigestion so frequent among the convalescent: some persons, however, eat, and digest with ease, a considerable amount of food, from the first day of convalescence from grave disease. We have observed two convalescents from typhus fever take, without injury and at one meal, upon the very day of the cessation of the disease, more than half a pound of solid food. Hildenbrand has made analogous observations: he relates that the appetite often amounts to actual voracity.* Costiveness is usually noticed during convalescence from acute disease; sometimes, on the contrary, there is diarrhœa. Respiration is easy while the person is at rest, but exercise and conversation cause dyspnœa. The pulse often remains frequent for many days; but if all the other signs are favorable, this frequency need not alarm us; it should not deter the physician from allowing the convalescent the food they request. In certain persons the pulse becomes slower than in the healthy state, owing, doubtless, to the rest and long continued diet required by the disease: there may be but fifty, or even fewer pulsations in a minute. Most convalescents experience palpitations, even from the slightest causes, as walking, or from the effect of a lively sensation or emotion; these are, however, by no means alarming; in the anæmic, a bellows' sound is

* *Typh. Contag.* Trad. de Gasc. p. 86.

usually heard in the heart and large arteries; in almost all cases the lower limbs swell readily, when the upright position is long maintained, and in the evening slight œdema is perceived around the ankles. Convalescents are habitually cold, even in the warm season, either because their natural heat is diminished, or because a prolonged continuance in their apartments, and in bed, has rendered them more susceptible to external cold. In very many, the cutaneous transpiration is abundant during sleep, and the secretion of urine is also increased. The grayish color of the fæces, often noticed, and the infrequency of their discharge, lead us to suppose that the biliary secretion is diminished at the commencement of convalescence.

One of the most remarkable phenomena of convalescence, is the excitement of the generative organs, causing strong venereal desire, lascivious dreams, and nocturnal pollutions. Many authors relate that old men who had not had any ejaculation for years, have experienced it during convalescence. The menstrual discharge frequently does not recur for many months after the cessation of the disease.

To the above phenomena, we shall add the desquamation of the cuticle and the loss of the hair, which occur in many individuals at a very advanced stage of convalescence. These phenomena are often observed after grave diseases, and especially after those accompanied by an eruption upon the skin, even if obscure, as in typhoid fever. The hair, when renewed, has not its original color or form, and from this arises its peculiar appearance in convalescents from severe disease.

To finish the picture of convalescence, we should mention the feeling of comfort, which is more and more lively in proportion to the completeness of the restoration, and those new delights tasted by the convalescent in the simple performance of the most ordinary acts of life; delights unknown to one who has never been ill. "No one," said Hildenbrand, "has experienced pleasure in perfection, if he has not felt that which arises during convalescence" Indeed, it is only when we have been deprived of health, as of any other enjoyment, that we can really appreciate it.

The duration of convalescence is often uncertain, because the epoch of its commencement and termination are not well defined. It can hardly ever be accurately determined; its proximate duration, only, can be known.

Many conditions, moreover, may prolong or abridge convalescence. The age and constitution of the individual, the nature and duration of the affection, the treatment, dwelling, season and regimen, are those most influential in determining the time which will elapse between the termination of the disease, and the complete recovery of health. Other things being equal, convalescence is shorter in infancy and youth; it is longer in persons habitually feeble and indisposed; in damp situations, in those where the houses are below the level of the ground, and in hospitals, than in opposite circumstances. The ingestion of unwholesome food, too rigorous

diet, or the opposite extreme, prolong the period of convalescence. It has likewise been observed to be shorter in spring than in autumn and winter. Finally, it is of very constant occurrence, that it is generally shorter after inflammatory diseases, than after those accompanied by great prostration. Excessive evacuations, (especially the sanguineous,) either spontaneous or artificial, occurring in the course of a disease, prolong convalescence.

When we attentively observe the changes which supervene during convalescence, we generally remark a daily increase in the regularity of action and freedom of the various functions; but we notice that the recovery does not take place with like uniformity and promptitude in the different organs. Not only are those which were primarily and principally affected generally the last to recover their energy, but among those secondarily affected, a certain number do not regain their normal state for some time after the others. Convalescence is a complex phenomenon; it is composed of the partial re-establishment of each of our organs: it may be complete in one patient, while it has hardly commenced in another.

Established convalescence does not always lead to an immediate and complete recovery of health: it may be impeded in its course by certain phenomena which are not of sufficient severity to constitute a morbid condition; it may be interrupted by the recurrence of the disease which preceded it. These two points in the history of disease will be examined in the two following chapters. — M.

CHAPTER XII.

CONSECUTIVE PHENOMENA.

By the words *consecutive phenomena*, are denoted those various disturbances of the functions which continue, or make their first appearance, after the natural termination of diseases. They are sometimes confounded with the phenomena of a prolonged convalescence, but, in general, are widely different, not only in degree, but because, for the most part, they affect a single function only, while convalescence is distinguished by a general debility affecting alike all the organs of the economy.

One of the most familiar examples of a consecutive *phenomenon*, is the yellow color of the integuments which sometimes continues after the causes, which have produced any obstruction to the secretion or excretion of bile, have ceased to act, as is apparent from the entire re-establishment of the digestive functions, the normal color of the urine and fæces, and the perfect regularity of all the functions; the icterus, in these cases, is no longer a symp-

tom, since there is no disease. The impregnation of the integuments by the coloring matter of the bile, is the persistent effect of a morbid condition which has ceased to exist; it is *not the sign of a present disease*, but only the *consequence of a disease already terminated*; and this icterus, which, at the time of its first appearance, was included among the symptoms, properly so called, is now but a *consecutive phenomenon*.

Of these consecutive phenomena, some are contemporaneous with the disease, as for example, pain in the side in cases of pneumonia; others appear a certain number of days after the commencement, but a considerable time before the termination, of the disease. An instance of the latter, is the yellow color of the skin, which shows itself after seven or eight paroxysms of intermittent fevers, and which continues for a greater or less time after convalescence. There are others which make their appearance when the disease begins to abate, and on this account have been considered by many physicians as critical phenomena; and, finally, there is still another class of these phenomena which are only known to exist after complete recovery, as the œdema which follows a great number of diseases.

It is apparent from this brief classification, that the consecutive phenomena of diseases are very numerous and of various descriptions; we only propose, however, in the following pages, to give an enumeration of the principal ones that come under our observation.

Many persons experience, after sickness, a remarkable diminution or increase in the size of the body. In the first case, instead of recovering their natural embonpoint, they continue to lose flesh, in the same manner as during sickness; in the latter, of which Tissot saw many examples, they discover an alarming tendency to obesity. In other cases of convalescence, the patient is left with a debility which affects the movements of the whole body, or particular parts of it, and sometimes with a *trembling*, more or less general. Hoarseness of the voice continues after some cases of angina and certain nervous affections. Pains are very common consecutive phenomena after herpes zoster and other phlegmasiæ. The organs of sense, particularly those of sight and hearing, remain oftentimes enfeebled after the other functions are completely re-established. Delirium was observed by Hippocrates, and Piquer saw two examples of it. We have also ourselves observed it. Entire sleeplessness is also a common consecutive phenomenon. Tissot thinks that this may be owing, in some cases, to the loss of habit. Sometimes we see various disorders of the digestive functions, such as loss of appetite, weakness of the stomachic digestion, and constipation so obstinate as to resist the most energetic treatment. Cough, hiccup, and frequency of the pulse, sometimes remain after the other functions have recovered their natural exercise. Excessive perspiration and abundant flow of the urine, are two phenomena that often appear after acute diseases, and one or the other almost invariably. Sometimes they occur alternately until the health is completely re-established. Their suppression is liable to

be followed by an increased exhalation in the cellular tissue, and the supervention of anasarca.

To the consecutive phenomena above enumerated, may be added, abscesses, gangrene and hectic fever resembling phthisis. These, however, are rather diseases, than simple consecutive phenomena.

Consecutive phenomena may increase or diminish in intensity, or remain stationary. They are various, also, in as far as they possess sometimes a continuous and sometimes a periodic character. The pains which follow herpes zoster, the dyspnœa which follows pneumonia, are continuous like those affections. On the other hand, the phenomena which remain or make their appearance after periodical diseases, have the same periodical character. Thus after intermittent fevers, we observe phenomena differing with regard to form and duration, and making their appearance at intervals corresponding to the attacks of the fever, as a momentary chill of the whole, or any part of the body, transient heat, a pain or spasm, and a brick colored sediment in the urine. Phenomena are sometimes observed, however, after diseases of this sort, which have not this periodical character. Of this class, are the swelling of the spleen, ascites, and the œdema of the lower extremities, which continue for a greater or less time after intermittent fever.

We can lay down no general rule with respect to the duration of consecutive phenomena. Generally speaking, however, they do not continue above two or three weeks, though sometimes longer. The weakness or stiffness of limbs, which sometimes follows rheumatic affections, has been known to continue during life. — O.

CHAPTER XIII.

RELAPSE AND RECURRENCE.

By the term *relapse* is signified the renewal of a disease during the period of convalescence; by *recurrence* (*morbis recidivus*), is understood the reappearance of a disease after the complete restoration of health.

Relapse is commonly produced by some occasional cause: exposure to cold, an error in diet, excessive exercise, a violent emotion, immoderate use of medicine, are the most frequent causes of the return of a disease.

Relapse is not of equal frequency in all affections; there are some diseases, as the contagious eruptive fevers, in which it never takes place; there are others, as peripneumonia and pleurisy, in which it rarely occurs; and finally, still others, as intermittent fevers, in which it is of frequent occurrence. The frequency of relapse in the latter affection has been attributed to the

course of these fevers, which have a marked tendency to reproduce themselves, and to the kind of habit the economy seems to have contracted, when the paroxysms have been many times repeated. A remarkable circumstance connected with the relapse of intermittent fevers, is their almost uniform occurrence at the day and at the hour, when the fever should have appeared, had not the paroxysms been suspended. *Strack* remarked that he had sometimes seen this regularity in the *recurrence* of fevers, after the lapse of several months and even a year; but the latter cases are very rare, and may admit of doubt; for however little the paroxysm be advanced or retarded, how can the application of the calculation to so considerable a lapse of time hold good?

The symptoms accompanying relapses are nearly the same with those of the primary affection. There is generally, however, more debility, which may increase the danger. Their duration is ordinarily longer, and when the life of the patient is spared, they generally leave him in a state of debility, from which he recovers but slowly, and, in some cases, never regains his strength. But to this assertion there are numerous exceptions; thus, the reappearance of erysipelas after a lapse of seven or eight days from the termination of the first attack, and in the part previously affected, is rarely so violent as at first, being of shorter duration, and, in some cases, only ephemeral.

Relapse should not be confounded with the new diseases which sometimes attack the convalescent, nor with *recurrence*.

The latter is occasioned sometimes by a peculiar predisposition, and sometimes by a fresh exposure to the occasional or specific causes of the disease. So great is the tendency of rheumatism to recur, that but few cases have been cited of persons who have suffered but once in their lives from this disease; the recurrence in such cases appears to be owing to predisposition. So with erysipelas of the face, which frequently reappears in some individuals at longer or shorter, and sometimes determinate, intervals, many examples of which are related by *Lorry* and *Franck*. The case is otherwise in the yearly recurrences of intermittent fevers in marshy places; these are owing to a fresh exposure to the specific cause of the disease.

The affections in which relapse never occurs, are also exempt from recurrence, with some few exceptions; yellow fever and typhus, for example, are never developed twice in succession, but may reappear after a greater or less period. In rheumatic affections, relapse is, perhaps, less frequent than recurrence.

The symptoms of recurrence present nothing remarkable; they are not constantly more violent, or lighter, than in the primary affection. A second, a third pneumonia is sometimes more violent than the first; but the contrary is often observed. We saw a man at *La Charité*, who was suffering from peripneumonia for the tenth time; the first inflammation had been severer than those that followed. In the first attack of erysipelas of the face this disease has been so violent as to endanger the patient's life, after-

wards diminishing in severity in proportion to the number of times it reappeared, becoming at last so slight as to produce but little functional disturbance, and to last but a short time. What we have said of erysipelas, equally applies to many other diseases, particularly angina tonsillaris. — O.

CHAPTER XIV.

GENERA, SPECIES AND VARIETIES OF DISEASE.

THE number of diseases to which man is liable is very great, and would be infinite, if we considered, as distinct diseases, the innumerable varieties of the same disease that come under our observation. The same affection is, perhaps, never presented twice under the same form.

If facts had been considered isolated from each other, and those among them which are analogous had not been distinguished, science would never have existed. The relation of facts to each other, the resemblance observed between many of them, and their union under a common name, indicate the commencement of medical science, and it is only at this stage that we can arrive at any knowledge of the course of diseases and the means of treating them with success.

It is natural to suppose that the genera of diseases recognized by the earliest observers, were very different from those of the present day, particularly as regards internal diseases. Doubtless they often mistook the symptom for the disease, considering as different affections what are merely different phases of the same affection, and confounding under the same denomination diseases totally distinct in their nature.

In proportion, however, as physicians have become enlightened by experience and observation, numerous modifications have been successively made of the genera originally admitted. Considered merely in this aspect, the study of pathological anatomy has effected an entire revolution in medicine. Physicians of the present day, however, are far from having arrived at the same conclusion with regard to the genera of diseases, and in fact have not even attempted to establish principles upon which this division can be founded. We shall endeavor to supply this deficiency.

Among diseases, there are those that consist in a material and perceptible lesion of the solids or fluids that enter into the composition of the human body; there are others in which we can discover no perceptible alteration, and still a third class in which there are only variable lesions.

Well defined lesions of an organ, as a fracture of a bone, a wound of an integument, a burn, etc., constitute diseases of a well

marked character. The same remark may be made with regard to some other lesions, the development of which is spontaneous, such as inflammations, cancer, tubercles, etc. It is true, that in each of these affections the material lesion is not precisely the same in every stage of the disease, but the changes which it undergoes are the same, and repeated observation only proves their regular succession and invariable connection. The redness of skin, which marks the commencement of many of the eruptive diseases, is a very different lesion from the pustules that are developed at a later period, and these differ no less, in their turn, from the thick crusts by which they are succeeded. Here, however, and still more clearly than before, there is but one disease. In typhoid fever, the anatomical lesions are different in each of the three periods of the disease. At its commencement the patches are hard or soft, prominent, and of a rosy white color; afterwards eschars and ulcerations make their appearance, and still later in the progress of the disease, the surface of these ulcers becomes clean, their edges become depressed, and they cicatrize and present a slate color. Here, again, there is but one disease, because these lesions depend upon one cause, and succeed each other in a determinate order.

The presence of foreign bodies in the interior of the organs, whether inanimate, as calculi of different kinds, or living, as cysts which participate in the general vitality, or parasitical animals, which have an entirely independent existence, constitutes many distinct genera of disease.

Collections of fluid in the interior of the organs, attended with no perceptible lesion of the solid tissues, form well defined genera of disease. Such are the effusions of serum and blood in the serous membranes and the cellular tissue. These effusions, it is true, often follow lesions of the solids, but since the accumulation is oftentimes the only material alteration which is perceptible, the accumulation must in such cases constitute the disease. The same remark extends to those cases in which certain fluids are excreted in excessive quantities, and often with some change in their qualities, as, for example, the urine in diabetes and Bright's disease. In certain hæmorrhages, the effusion of blood from the vessels which naturally retain it, is equally a single perceptible lesion.

Sanguineous plethora and anemia may also be classed among diseases in which there exists a material perceptible lesion. The diminution in the quantity of the blood in anemia has been measured with great exactness, and its increase in cases where there are symptoms of general plethora can hardly be called in question.

Diseases arising from specific causes form also distinct genera. The sting of the bee, the cutaneous affection that follows contact with the nettle, the bite of the viper, the virus of variola, vaccinia, rubeola and scarlatina, syphilis and glanders, and poisons of every kind, give rise to a distinct class of affections, in which the material lesion, whatever it may be, is only a secondary phenomenon. It is, in fact, in these cases, the *cause* that *constitutes* the disease.

Intermittent fevers, in the production of which malaria plays so important a part, are, as a general rule, a well defined class of diseases. If their symptoms, type, and the specific action of quinine in their treatment, evidently distinguish them from other diseases, should we not refer this resemblance of their phenomena to the identity of their cause?

With regard to those diseases in which there is no material lesion of the organs, and which arise from no specific cause, as the nervous diseases, we can only establish their genera from an examination of their symptoms. Upon this subject the greatest difference of opinion has existed among physicians down to the present time, and we cannot safely form conclusions in regard to it, until we have a more thorough knowledge of the causes which produce these affections and the lesions of which they consist. A great number of them have already been found to be connected with organic lesions upon the existence of which they evidently depend.

But whatever the genus of a disease may be, it is not always developed with the same symptoms, attended with the same succession of phenomena, protracted to the same duration, or inclined to the same termination. Variola, for example, is always accompanied by an eruption *sui generis*, which cannot be mistaken; but the general phenomena of this affection, and the number and form of the pustules, are exceedingly various. In one case, the pulse is full, the temperature of the body increased, the pustules round, distended and surrounded by a red areola; in another, on the contrary, the pulse is feeble, the skin almost cold, the eruptions feeble, of a brownish color, and with a pale or livid areola. In some cases, the eruption is rare and scattered nearly uniformly over the whole skin; in others, the pustules run together over the whole, or are collected in great numbers on some part, of the body. Sometimes the disease is attended with no danger; at other times the danger is imminent, and in a third class of cases death is almost inevitable. Now would it be possible to acquire a correct idea of variola by studying it only under one of the numerous forms which it assumes? Undoubtedly not; and we may apply the same remark to the study of every disease.

It is then essential in pathology to understand thoroughly the different modifications of each disease. These modifications, however, are not all equally important. Some of them are so slight that they may be entirely disregarded, while others, it is useful, and even indispensable, to distinguish. These latter have been divided into two classes; in the first class have been placed those of, apparently, a greater, and in the second, those of a less, degree of importance. To the former class the term *species* has been applied, and to the latter, the term *varieties*, although even at the present day no fixed rule has been established for distinguishing the one from the other. The word *species* has not the same signification in pathology, as in botany and zoology. In these sciences, it designates the assemblage or class of individuals that perpetuate themselves by reproduction; while the word *varieties* comprises

those individuals which, though differing somewhat in appearance, can reproduce, under given circumstances, individuals resembling those from which the variety derives its origin. In pathology, the word species expresses a mere abstraction. Its distinction is so vague and indefinite, that some have admitted twice, and even four times, the number that have been admitted by others. *Sauvages* carries the number as high as eighteen hundred; *Sagar*, to two thousand five hundred; while *Cullen* admitted only six hundred. There is hardly an instance, as *Bayle** has remarked, in which the same author has published several editions of his works without modifying, in some respects, the species that he had formerly admitted.

If it is impossible, as we have reason to believe it is, after the fruitless efforts of nosologists, to obtain a definition of species which shall be a uniform rule applicable to all diseases, we should, nevertheless, in making such a distinction as we can, have regard to the objects of the greatest utility, and determine the species of the disease from the circumstances that exercise the greatest influence on its treatment. In all the acute *phlegmasiæ*, there is, according to us, the inflammatory, bilious, adynamic and ataxic character, which ought to determine their species, because the character of a disease, considered with reference to its treatment, is as important as, and sometimes more so than, its genus. Whatever the genus of a disease may be, if it is attended with the general symptoms of inflammatory fever, we resort to blood-letting and the antiphlogistic regimen; if it has an adynamic character, we must have recourse to stimulants and tonics; if it is legitimate, that is to say, if it is accompanied with the general phenomena, only, which are peculiar to it, without any of the features which characterize inflammatory or adynamic fevers, &c., repose and a slender diet are most generally the only conditions necessary to its cure; even these are not always indispensable, as in some cases of erysipelas, chronic catarrh, etc. The division of the inflammations into the acute and chronic species is no less important, considered with reference to their treatment, than the preceding. With regard to hæmorrhages, their division into two species, the active and passive, has the advantage of the same practical character; but since there are many hæmorrhages that belong to neither of these species, it is necessary to recognize a third species which can hardly be confounded with the others. This division is also applicable to fluxes, effusions, and particularly dropsy, and may be extended with advantage to certain nervous affections. The happy effect of tonics, which have been used for a long time, seem sufficient to prove the existence of passive neurosis; and the extraordinary cures that have been effected in other cases by a totally opposite course of treatment, in addition to other circumstances, would induce us to recognise the existence of active neu-

* *Thèses de la Faculté*, Année, 1801, No. 71.

rosis. There are, doubtless, cases, however, which belong to neither of these two classes.

The modifications that take place in the symptoms of those diseases termed *organic*, with the consequent changes of treatment, are unimportant, and constitute rather varieties than species unless they are connected with some peculiar diathesis, as a scrofulous, scorbutic or syphilitic taint.*

Varieties of disease are the result of a multitude of circumstances some of which are of practical importance, as, for example, the general severity of the disease, the predominance of any particular symptom, or the appearance of any remarkable epiphenomenon, and also the various peculiarities relative to seat, extent, cause, type, etc. The number and form of the pustules in variola, the seat of the exanthema in erysipelas, the severity of the pain in pleuropneumonia or of the delirium in typhoid fever, constitute varieties. The same may be said of the continuous or remittent progress of continuous diseases; of the quotidian, tertian or quartan type of periodic diseases, etc. We recognise varieties, also, in diseases according as they arise from external causes, or are produced by an internal disposition, as they are fixed or movable, as they affect external or internal parts, the limbs and trunk, or the organs more or less essential to life. Varieties of diseases are sometimes referable, also, to the manner in which they terminate, to their regular or irregular return, etc., and they frequently result from complication. — O.

CHAPTER XV.

COMPLICATIONS.

THE word complication, in its most extended meaning, expresses the mingling together of many different things, of which it may be important to ascertain the presence and determine the nature. In pathology, we understand by complication, the concurrence or simultaneous existence of many diseases capable of exerting a mutual influence on each other. The coexistence of many entirely independent diseases, as, for example, cataract, calculus in the bladder, and an external injury, is not a complication. Some physicians† have proposed to limit still farther the meaning of this

* The division of diseases into *false* (*morbi spurii, nothi*), and *true* (*morbi exquisiti, legitimi*), has been properly rejected by physicians of the present day. The classification into these species has been entirely exploded by recent nosology.

† Fernel and Plempius, two physicians of the sixteenth and seventeenth centuries, divided diseases into *solitary* and *multiple* (*morbi solitarii et multiplices*). They subdivided solitary diseases into *simple* and *compound*. They termed a disease *simple*, which affects one or more parts of the body in the same manner; as, for example, pneumonia confined to a single viscus, and gout which attacks at

word, and to apply it only to diseases which exist simultaneously in the same organ, and concurrently produce a disturbance of the same function; but their opinion does not carry with it the weight of authority.

Some authors have fancied that they traced the influence of complication even in the most trifling cases of disease, while others have been almost wholly unwilling to recognize its existence. It becomes important, then, to establish some principles by which we may be guided with regard to a subject, which, though not of the greatest importance, is certainly not destitute of interest.

1. The *simultaneous development* or *consecutive extension* of the *same disease*, of a phlegmasia, for example, or an organic lesion in *continuous* or *contiguous parts*, is not sufficient to constitute a complication. The simultaneous inflammation of the pleura, the parenchyma of the lungs and the bronchial membrane, is obviously the extension of one disease to different tissues, and not three diseases. So in surgery, the injury of the integuments that cover the seat of a fracture is never regarded as a complication. A cancerous affection of the pyloric extremity of the stomach is also a simple disease, although the disease extends to the lymphatic glands, the epiploon, the pancreas or the liver.

2. The *simultaneous existence* of *similar lesions* in *organs*, more or less *remotely* situated from each other, does not constitute a complication, when these lesions result from the same cause. Thus the tubercular or cancerous affection of different organs in different parts of the economy is a simple disease, because one cause, however latent, has given rise to these multiple lesions.

3. The simultaneous existence in different parts of the body of *lesions differing entirely from each other*, is insufficient to constitute a complication, when these lesions are *owing to the influence* of one ascertained cause. We may mention, as examples of this, the sore throat which sometimes accompanies variola, the swelling of the lymphatic glands of the neck in cases of tinea, and the development of ulcers, excrescences, exostoses and buboes, in cases of syphilis.

4. Neither is a complication the coexistence of two diseases, one of which is a *necessary consequence of the other*. Of this

the same time different articulations, but which arises from one cause, and is followed by the same results. They termed those diseases *compound* which, though possessing the characteristics of single diseases, arise from a concurrence of different causes; such are the adynamic or bilious phlegmasiæ.

They recognized three sorts of *multiple* diseases. 1. *Complicated diseases*, (*morbi impliciti, complicati*), those that exist at the same time in the same organ, and concurrently produce a disturbance in the same function, as, for example, pneumonia and phthisis. 2. *Connected diseases* (*morbi connexi vel consequentes*), those cases in which one disease concurs in the production of another; such are peritonitis accompanying inflammation of the uterus, and gangrene developed in the integuments in severe cases of fever. 3. *Distinct or separate diseases* (*morbi disjuncti vel separati*), those that do not affect the same function, and exert no influence in the production of each other; two wounds, one of the thigh, the other of the head, the simultaneous existence of gout in the feet and lipoma in the thorax, or of ulcers in the leg and pneumonia, are obvious examples.

class of cases is peritonitis, resulting from a perforation of the intestines or stomach, and rarer examples of it are those cases of pleurisy which follow the ulceration of the pleura in consequence of the softening of a pulmonary tubercle.

5. Lastly, the *general phenomena* that accompany the *affection* of certain organs, do not constitute a complication. In cases of this sort there is but one affection, although the general disposition of the patient gives the local disease a peculiar modification, as for example, in bilious or adynamic pneumonia.

It follows, in the first place, that a complication cannot exist except when there is a coexistence of diseases entirely distinct from each other, either as regards their origin and the mode of treatment proper for their cure, or their seat and the anatomical lesions of which they consist; and, in the second place, it is also a necessary condition, as we have before remarked, that these diseases be not entirely independent, but capable of exerting a mutual influence on each other.

The number of diseases that may exist at once in the same individual and form a complication is unlimited. It is rare, however, to see more than two. We sometimes meet with cases where an individual is affected with five or six different diseases; but these cases are very uncommon, and, besides, in a greater part of them the diseases have an entirely independent existence, and consequently come under the head of coexistence, and not of complication.

The causes of complication are very various. Sometimes each disease arises from a specific cause, as in a complication of two eruptive fevers. Sometimes the same occasional cause develops two distinct affections. Thus, the effect of cold may give rise, in the same individual, to a rheumatic affection and a pulmonary catarrh, although, in cases of this sort, there is reason to suspect the concurrent influence of predisposition. Complications are not equally common in all conditions of life. They appear to be of more frequent occurrence in infancy and mature age, than during the intermediate period, and in the inhabitants of cities, rather than those of the country.

The most important point to consider, in the examination of this subject, is the influence which complicated diseases exercise on each other. In some cases, the supervening disease diminishes or increases the severity of the primary affection, and in others has the speedy effect of, either temporarily or permanently, suspending its symptoms. Acute diseases are sometimes observed to affect in this manner chronic complaints, to arrest which, all the resources of art have been in vain resorted to. Incipient variola has been known to be suspended by the development of rubeola and on the termination of the latter, to make its reappearance. A visceral phlegmasia that follows an injury almost invariably modifies the symptoms of the external wound, and the nature of the fluid which it exhales. Erysipelas, which is developed in oedematous limbs, often terminates in the suppuration of the cellular

tissue and the gangrene of the integuments. In another class of cases, the supervening disease does not influence the one that precedes it but is influenced by it. Examples of this are cases of accidental wounds and fractures in persons afflicted with scurvy. The scorbutic affection undergoes no perceptible change, but the fractures do not unite, and the wounds assume the appearance peculiar to scorbutic ulcers.

We conclude, that wherever many diseases exist simultaneously; 1. they may either have no influence upon each other; 2. the second disease may modify, suspend or terminate the first; or 3. the first, may aggravate the character of the supervening, disease. — O.

CHAPTER XVI.

DIAGNOSIS.

DIAGNOSIS* is that part of pathology whose object is the discrimination of diseases. To discriminate a disease is to recognize it whenever it exists, whatever be the form it assumes; and also to decide that it does not exist, whenever other diseases appear with symptoms similar to its own.

“The science of diagnosis” says *Louis*, in his Memoir upon fungous tumors of the dura mater, “is the most important, most useful, and most difficult of all the divisions of medical science. The discrimination of the peculiar nature of each kind of disease, and of its different species, is the source of curative indications. Without an accurate and precise diagnosis, theory is ever at fault and practice often unfaithful.”

There are two different modes of considering diagnosis; successively, in single diseases, or by abstraction of particular cases, as a branch of general pathology. The latter only will occupy us at this time; the former belongs to the special description of disease.

Diagnosis, thus generally considered, presents many points of importance; of these the principal are, 1. the signs upon which it should be founded; 2. the conditions necessary for its formation, both on the part of the patient and the physician; 3. the proper mode of examination and interrogation of the sick, in order to acquire a knowledge of the affections under which they labor; 4. the component elements of diagnosis, viz. the seat and nature of anatomical lesions, and the form and type of symptomatic phenomena; 5. the circumstances rendering diagnosis difficult or uncertain.

§ I. *Diagnostic Signs.* — The term *diagnostic signs* comprises

* *Διάγνσις*, discernment; *δια*, through (thoroughly,) *γινωσκω*, to know.

all those circumstances which enlighten us in regard to the genus or species of a disease; the principal are, past or present symptoms, the predisposing or determining causes of the disease, its mode of access and progress up to the moment of examination, and the effect of remedial measures. Diagnostic signs are not all of equal importance; those termed *characteristic*, are such as either alone, or united, are sufficient for the recognition of the disease; for example, the sense of tension, pain in the abdomen, vomiting, etc., attending peritoneal inflammation. These signs have also been called *true, essential, sufficient, univocal*, because they leave no doubt in regard to the existence of the disease. Among these latter signs there are some known as *pathognomonic*,* it being affirmed that the disease never exists without them, and that they are never present except the disease exist. Characteristic, differ from pathognomonic, signs, in this respect, that the disease may be manifested without the former, but never without the latter. But, as has been correctly remarked, if the term pathognomonic be employed in so rigorous a sense, no sign would deserve the appellation. The mobility of the fragments in fracture of the bones, and the flow of blood in hæmorrhage, are not pathognomonic signs, because both fracture and hæmorrhage may occur without these symptoms. For this reason most modern authors have employed the terms *pathognomonic* and *characteristic* without any distinction, to designate the signs clearly indicating the existence of disease. Other signs, known as *common, equivocal, insufficient*, are those met with in many diseases, but appertaining especially to none; such are frequency of the pulse, elevation of temperature and thirst. These signs are not indifferent in diagnosis, but are less important than the preceding.

The signs perceived by the physician's *own senses* have an entirely different value from those derived from the *account of the patient* and his attendants. It is mainly by the aid of the former that he should form his opinion; the latter will often mislead him if he yield them his entire confidence.

Finally, there are *positive* and *negative* signs in disease, that is, the absence of certain phenomena and the existence of others, may concur in deciding the physician's opinion. Negative signs, however, are of far less value than those which are positive; thus, fine and dry crepitus, sanguinolent sputa, vomiting of dark colored matters and epigastric tumor, are signs of pneumonia and cancer of the stomach; the absence of these signs does not prove that the lung is not inflamed, nor that the stomach is free from scirrhus.

We consider it needless to enlarge farther upon the diagnostic signs of diseases; it has already been our duty in various parts of this work, and particularly in the long chapter devoted to symptomatology, to point out the diagnostic value of very many; we shall again find it necessary to notice them at a future time, when speaking of the different modes of exploration necessary for the

* Πάθος, disease; γνωμονικός, pertaining to discrimination; γινωσκω, to know.

formation of diagnosis, of the form and type of symptomatic phenomena, or, finally, of the conditions which render diagnosis difficult. Whatever we might add in this connection would belong to the particular history of disease.

§ II. *Necessary Conditions for the Formation of Diagnosis on the part of the Patient and Physician.*—'There are many conditions on the part of the patient, which, if not indispensable in forming a diagnosis, are, at any rate, well suited to render it more easy and exact. The first is, sufficient intelligence to understand the questions proposed by the physician, and to answer them with precision. We see how difficult it is to form a decided opinion in regard to a patient, when his intellectual faculties are naturally obtuse or accidentally disturbed, when he is too young to express himself verbally, or when we do not understand his language. Another important condition is the absence of all attempts at deception on the part of the patient, either by concealing certain circumstances relating to his disease, or by stating symptoms which he does not experience. There are some patients whose intelligence is sufficient, and who do not intend to deceive the physician, but who render their examination very embarrassing by the manner in which they describe their sensations and answer the questions proposed to them. Instead of simply stating their sufferings, and replying directly to questions, they give their opinion of the peculiar nature of their disease; one is tormented by mucous discharges, bile, the blood, or by an acrimonious state of the humors; another has irritation, tension, or relaxation of the nerves, etc. It is easy to conceive that when a patient has expatiated for an hour or more upon his sensations, constantly dwelling upon the biliary and mucous secretions, the acrimonies, and the nerves, the physician will have made no progress in the diagnosis. We might suppose that by requesting patients not to use such language, but only to tell what they actually feel, we could induce them to speak more intelligibly; but we are entirely mistaken; the greater number do not change their language in the least. The physician needs all his patience to enable him to listen; and in certain cases he is obliged to form his opinion solely by what he sees, almost entire abstraction being made of all that he has heard.

The *necessary conditions* for accurate diagnosis *on the part of the physician*, are numerous. The first, and indispensable condition, is a thorough knowledge of pathology. He who is not familiar with the signs of all diseases is not fit to give an opinion of any one in particular. Another condition, no less important than the theoretical knowledge of disease, is long and careful observation, and ability, by means of frequent dissections, to confirm or rectify a diagnosis made during the progress of disease. The physician who has not for a long time applied his knowledge at the bedside and assisted at many post-mortem examinations, is certainly unfit to form a correct opinion of the diseases he observes.

Supposing his diagnosis to be correct in some cases, it would be the opposite in a great number, and in all, it would be formed slowly and doubtfully. Skill in diagnosis, which constitutes, in connection with a readiness to perceive indications, that quality known as *medical tact*, can only be acquired gradually; it implies the union of all the qualities necessary to the observer; integrity of the senses, which thus distinctly transmit every modification of the phenomena within their jurisdiction, a firm and penetrating mind, capable of properly collating, comparing with discernment, and deducing from facts the inferences and consequences which they furnish, and which, uniting boldness and prudence in due proportions, dares at times to obey the dictates of a seeming inspiration, which is really an accurate, although a rapid, appreciation of the most expressive phenomena of the disease. These precious qualities are rarely combined in one individual, and the number of physicians remarkable for great skill in diagnosis is always very limited.

There is still another condition, which, if not indispensable, is at least of great service to the physician in the diagnosis of diseases; this is a knowledge of the normal state of the various functions of the patient to whom he is called. The modifications made by disease in the physiognomy, gait, voice, mental disposition, circulation and respiration, are often hardly appreciable by the physician who has not seen the patient when in health, while they would be very manifest to him who can make this comparison. On this account we must approve the wise forethought of those persons who wish to be known during health by the physician who is to attend them when ill. In order to respond properly to the confidence of these individuals, the physician should thoroughly examine the condition of all the functions as he would do in one laboring under disease.

Not only is it necessary for the physician to have exercised his senses for the detection of every modification of morbid phenomena, and his mind in determining their value, but he should also have acquired by practice, and as far as possible by instruction from others, the habit of employing the different modes of exploration, by the aid of which he attains a knowledge of certain phenomena, likely to escape ordinary observation, or at any rate, to be far less accurately appreciated. These modes of exploration are pressure, palpation, touch, succussion, mensuration, percussion, auscultation, examination with various kinds of sounds, specula, magnifying glasses, the microscope, and chemical reagents.

1. *Pressure*. Pressure made with the hands or fingers, and which should not be confounded with palpation, is doubtless a very simple mode of exploration, but one that furnishes, notwithstanding, numerous and important signs. In the first place, it enables us to recognise the various changes in the resistance of diseased parts, as the hardness of the cellular tissue in phlegmonous inflammation, the tension of the abdomen in tympanitis, its simple resistance in chronic peritonitis, the elasticity of tumors

containing pus, the flaccidity of parts whose volume has rapidly diminished, as the abdomen after the employment of the trocar, or after parturition, or that of an inflammatory tumor after the natural or artificial evacuation of its purulent contents.

When, by equable and simultaneous pressure made on both sides of the abdomen, with both hands, and over exactly corresponding regions, a decided and constant difference is perceived in regard to the extent to which each hand penetrates, we should suspect some deep-seated lesion of the least depressible side of the abdomen, even when the hand does not distinguish any alteration in the consistence of the tissues. It should not be forgotten that an abnormal direction of the dorsal or lumbar portion of the spinal column might cause the same sensation, without furnishing the same inference.

When air or serum is infiltrated into the subcutaneous cellular tissue, pressure, by displacing the infiltrated fluid, causes, first, a sensation of crepitation; secondly, it conveys the impression of penetration by the finger into the compressed part; and if two fingers be used to pinch up a fold of the skin, upon the thigh, for instance, they approach each other, and a transient pitting of the infiltrated part succeeds this action of the fingers. In typhoid fever, when pressure is made in the right iliac fossa, a remarkable gurgling is produced, which occurs also, from similar pressure, in abscesses into which air has penetrated.

When a liquid is contained in a cavity which has no outlet, and whose parietes are elastic, as the knee or abdomen, rapid pressure furnishes us with important signs; the shock of the patella against the opposite surfaces of the femur and tibia, shows a synovial effusion which recedes before the finger. When the abdomen is simultaneously the seat of moderate effusion, without evident fluctuation, and of a tumor so deeply seated as to be inaccessible to common palpation, we find a valuable mode of exploration, as yet very little known by physicians, in rapid pressure practised with the extremities of the fingers. By means of this, we discover, often at considerable depth, something *resistant* against which the abdominal parietes strike; and the sensation of a body which retreats before the fingers and returns immediately on the cessation of pressure, indicates that there is liquid interposed between the tumor and the integuments, the sound on percussion of the abdomen, as is noticed in these cases, being entirely flat.

Pressure, also, furnishes certain signs relative to the change it effects in the coloration of the parts.

Certain kinds of erythema, are characterized by the disappearance of their redness under the pressure of the finger, as erysipelas, scarlatina, and roseola; others by its persistence, notwithstanding pressure, or even by its increase, as *purpura hæmorrhagica*; the reason of this doubtless is, that the surrounding skin becomes whiter by pressure, and makes the darkness of the hæmorrhagic spot more intense by contrast.

In cases of very slight rubefaction, as that which is diffused

over the entire surface of the body in sanguineous plethora, or around certain joints affected with rheumatism, pressure, made with a single finger, causes a discoloration of the compressed point, and renders the slight redness of the neighboring parts more manifest.

Finally, certain pains, particularly those of an inflammatory nature, are aggravated by pressure; others are not influenced by it, as is observed in some cases of sciatic neuralgia; the intensity of others is diminished, as the abdominal pain of lead colic; others, still, are momentarily suspended by strong pressure upon the affected point, as certain varieties of hemicrania. Lastly, entire absence of sensation under pressure sufficiently strong to give pain, as that made with the extremities of the fingers, or even with the nails, shows complete loss of sensibility.

2. *Palpation.* *Palpation*, or the act of feeling, is one of the most useful and most frequently employed means of exploration. It consists in the methodical application of the physician's hand to the affected parts, for the purpose of appreciating the various alterations which may have taken place. It requires much circumspection, dexterity and practice united, in order to derive from it all the advantage it possesses, to avoid the dangers which it sometimes occasions and the errors to which it may give rise. The following is the best mode of procedure.

The parts upon which palpation is to be practised, should be so placed as that their enveloping muscles may be, as nearly as possible, in a state of complete relaxation; muscular contraction would have the double disadvantage of withdrawing the parts from the hand of the examiner, and sometimes even of simulating tumors, as is particularly the case in regions occupied by intersecting muscles, as the recti abdominis. It is often useful to vary the attitude of the patients; by a comparison of the results obtained in different positions, we complete, and sometimes rectify, the ideas suggested by the first examination.

It is generally preferable that the parts to be examined should be uncovered: delicate linen, however, does not interfere with palpation, indeed, it often facilitates it, especially in sensitive persons, in whom the coldness of the hand employed in palpation, or the disagreeable sensations caused by exposure of the person, excite involuntary muscular contraction, which ceases with the removal of its exciting cause.

In practising palpation, the whole hand, or even both hands, should be used, according to the extent of the parts, and not one or more fingers only, except in cases where the volume of the affected part will admit of no other mode of exploration. Usually, the whole hand should be at once applied to the diseased part, instead of pressing perpendicularly, or even obliquely, with the extremities of the fingers, as is often done by inexperienced persons. We should commence by palpation of the neighboring parts, or of those similar in kind to the one we wish to examine, as for example, the healthy limb, breast, testicle, or side of the

abdomen, previously to those affected, so that we may, by a knowledge of the normal condition, better appreciate the alterations, sometimes slight, produced by disease in the unhealthy parts. The hand should at first be simply applied to these parts; if it encounter no resistance and produce no pain, we should gradually exert more pressure, directly, at first, afterwards, with slight lateral movements. When we discover an enlargement or swelling, we should endeavor to circumscribe it completely, by surrounding it on all sides with the fingers, sufficiently flexed and separated from each other, to be applied to the whole of the resisting or swollen surface, and thus ascertain its limits. Frequently, one of the hands should be so placed as to favor the examination which is particularly conducted by the other: thus, in order to verify an obscure fluctuation, we press back the fluid with one hand towards the place where the other hand is applied: in examinations of the abdomen, one hand, applied to the right lumbar region, pushes the liver forward, so that the other hand can better appreciate its volume and its consistence. In order that the hand placed upon the hypogastrium may ascertain the condition of the uterus, it is often requisite to raise the os tincæ with the index finger of the other hand. In the examination of inflammatory tumors, abscess, certain species of hypertrophy, various kinds of organic degeneration, and arterial aneurism, palpation furnishes signs of peculiar value, especially when uniformly identical results are obtained on repeated trials at different intervals. It enables us to discover the number, size, form and consistence of the above tumors, to judge whether their surface be smooth or uneven, whether they are soft or hard, and if these qualities characterize them throughout or only partially; whether they are elastic or fluctuating, unique or multiple, fixed or movable; if they exhibit internal movements or pulsations; if these pulsations be isochronous, or not, with those of the heart or arteries, if they are the effect of simple displacement, or of an actual expansion, if they may be referred to that undulatory thrill observed in many diseases of the circulatory system, especially in certain alterations of the cardiac orifices and in varicose aneurism, etc.

Palpation, moreover, repeated at suitable intervals, enables the physician to judge of certain changes which time and remedies effect in the course of diseases; diminished or increased volume of parts already examined becomes in this way the most certain of signs, and is suggestive of the most positive ideas. We should, however, remember that various modifications, taking place either in the situation of the tumor or in the surrounding parts, may sometimes deceive the practitioner. A cancerous tumor, developed in the greater curvature of the stomach, is more or less apparent according to the state of vacuity or repletion of that viscus, and in proportion to the amount of gas contained in the neighboring intestines. We have so frequently observed, in cases of this description, and in others analogous, the difficulty of reaching the tumor lead to the supposition of its decrease, or even its disap-

pearance, that we have thought proper particularly to notice this source of error.

The simple changes wrought by disease in the natural solidity of the organs, are, moreover, important phenomena to establish, and can only be appreciated by means of palpation. Not to mention that relaxation of the integuments and muscles, which is, as it were, the first stage of emaciation, and which in some instances furnishes us with an important sign, we would notice that circumscribed hardness and the consecutive engorgement of a certain portion of the integuments, where deep-seated inflammation is developed, or purulent matter collected; finally, we would call to mind that resistant state of the abdomen so precious in the diagnosis of certain cases of chronic peritonitis.

3. *Examination by the Touch.* *Touch** is a species of palpation made by one or more of the fingers, introduced into parts naturally inaccessible to the eye, as the vagina and rectum, with the design of verifying different physiological and morbid conditions, either of these passages, or of neighboring organs.

The index finger of either hand is usually the only one employed in vaginal and rectal examinations; it is very rare that diagnosis is assisted by the introduction of two fingers into the same passage; but in some circumstances, when we wish to examine the recto-vaginal parietes, we introduce, simultaneously, the thumb into the vagina, and the index finger of the same hand into the rectum. The nail of the finger which is used in such examinations should be short, and smooth, so that the pulp of the finger may be more accurately applied to the parts, and no pain or laceration be produced. Previously to such an examination, the bladder, and especially the rectum, should be evacuated. These preliminaries being fulfilled, and the finger being covered with cerate or some other unctuous or mucilaginous substance, we proceed as follows, for vaginal and rectal examinations.

If we intend to examine the vagina and uterus, the woman may be either recumbent or erect. If the former position be adopted, she should assume the dorsal decubitus, the body being somewhat inclined upon the pelvis, so as to relax the muscles as completely as possible, the thighs being slightly separated and flexed. The physician should stand, by preference, at the right side of the bed, so that he may use the index finger of the right hand. If the patient be in the upright posture, she should be requested to lean upon some firm support, separating the thighs slightly, and the examiner should be before her, upon a low seat, or resting upon one knee. Whatever be the position, we should avoid exposure of the patient under an examination more or less trying to nearly all females. With the thumb and middle finger of the hand em-

* The term "toucher," which we have rendered by the English word *touch*, is used in a medical sense, by the French, to express explorative examination by the finger, usually, the index finger of the right hand; in some rare cases, two fingers are used, as is mentioned in the text. The term is employed, in the vast majority of cases, to indicate *vaginal* exploration with the finger. — TRANS.

ployed, we slightly separate the labia majora of the vulva, the index finger is readily introduced into the vagina, while the other fingers are strongly flexed upon the palm of the hand. The finger should enter the vagina slowly, in order to avoid the pain which might be occasioned by a rapid introduction, and to appreciate more thoroughly either the changes which may be detected in the parietes of the passage, as regards heat, sensibility, consistence, form, and moisture, or, in certain cases, to ascertain the formation of the pelvic cavity. When the finger has reached the os tincæ, which will be recognized by its form, consistence, and by the central depression which distinguishes its orifice, we ascertain if it be in its normal position, if depressed or inclined to the right or left, forward, or backward; the sensibility, length and volume of the neck, whether it be hard, or soft, sometimes the inequalities of its surface, the relative size of the two labia oris tincæ, the degree of dilatation of its orifice, as well as its form, elevation and direction, should each be the objects of attentive examination. We next proceed to the examination of the uterus. For this purpose, raising the finger, as if to elevate the organ, and carry it backwards, towards the brim of the pelvis, we judge of its weight and mobility, and if the woman be pregnant, we may thus determine and perceive the *repercussion* (*ballotement*) of the fœtus. When the patient is in a horizontal position, the unoccupied hand should be placed upon the hypogastrium, in order to appreciate the volume of the uterus, and accurately determine its elevation; by this means, we may, in certain cases of abdominal tumors of difficult diagnosis, gain a more accurate knowledge of their seat and connections; by alternate pressure of the hand, applied to the abdomen, and of the finger resting upon the uterus, we can generally ascertain whether the tumor under examination be formed by the uterus itself, merely attached to it, or distinct from it.

In order to derive all the advantage possible from this mode of exploration, it is often necessary to change the position of the patients, and to place them alternately in the horizontal and upright position. The latter is particularly useful when we wish to ascertain with accuracy certain deviations of the uterus, especially prolapsus, or to verify the phenomenon of *repercussion* of the fœtus.

In all cases where morbid changes in the vagina, or the neck of the uterus, are discovered by the touch, the physician should examine ocularly, and by the sense of smell, the finger which has been employed, in order to judge of the changes which may have occurred in the vaginal mucus, or any other matters remaining upon the finger.

In rectal examinations, the horizontal posture will generally be convenient, the body being inclined to one side, with the corresponding limb extended, the other slightly flexed. The index finger should be introduced more slowly than in vaginal examinations; and in case of strong contraction of the sphincter, we should wait for its relaxation. Still greater caution is requisite when the margin of the anus is the seat of hæmorrhoidal tumors, or of fissure. The

finger thus introduced into the intestine should be moved gradually over the whole internal surface, in order to appreciate the various modifications which may exist, in its sensibility, tension, heat and consistence, or, as regards any inequalities it may present, such as granulations, wrinkles, ulcerations, tumors, with, or without a pedicle, fræna, strictures, or dilatation of this portion of the rectum. The rectal touch may moreover discover, in the male, through the recto-vesical parietes, calculi, engaged in the inferior extremities of the ureters, or occupying the base of the bladder, or tumefaction and induration of the prostate, which is a frequent cause of retention of urine. In the female, we may by this means detect augmented volume of the uterus, its deviation from the normal position in retroversion, and certain fibrous tumors developed in its posterior parietes, near its external surface; it also furnishes valuable signs in certain forms of extra-uterine pregnancy, and, in some very rare cases, reveals the absence of the uterus.

Vaginal or rectal touch is also indispensable for the diagnosis of diseases which have their seat in the pelvic cavity, exteriorly to these passages and the organs with which they are immediately connected; such as that kind of abscess which often occurs after parturition, and scirrhus tumors and exostoses developed within the pelvis, which would remain unknown in most cases, if this mode of exploration did not enable the physician to seek for and discover them.

The thorough exploration of the posterior fauces, by means of the finger, may be considered analogous to the above, its purpose being to examine the most remote portion of the nasal fossæ above, and the various alterations of the epiglottis, arytenoid folds, and middle portion of the pharynx, below. This examination, in which we are sometimes obliged to keep the maxillæ separated by means of some resistant body placed between the molar teeth, may suffice of itself, in some cases, to establish the diagnosis of certain very obscure diseases, as polypi developed in the nasal fossæ, œdema of the glottis, abscess and foreign bodies in the pharynx.

In concluding our remarks upon this mode of exploration, we deem it necessary to repeat an opinion daily expressed in our clinical lectures, viz., that this kind of examination is too much neglected, that most physicians are not aware how much information it supplies, nor how many errors may be avoided or rectified by its aid; and that consequently, it is an imperative duty to have recourse to it whenever any circumstance draws our attention to those organs where its application is possible.

4. *Succussion.* Succussion consists in shaking the patient's body with sufficient force to agitate the fluids and gases contained in one and the same cavity, and to cause more or less distinct gurgling.

A lateral shock given to the body, and frequently repeated, by means of the two hands placed upon the lower part of the chest, one on the right, the other on the left side, usually enables us to detect this species of gurgling, without the necessity of auscultation.

tion; in most patients the sound is sufficiently distinct to be perceived at a considerable distance.

Succession is applicable to but a small number of diseases. We cannot, indeed, produce the sound above-mentioned, except in cases where gas and liquids are contained in the same natural or accidental cavity, and such affections are rare; the principal are hydro-pneumothorax, (an affection almost always consecutive upon the ulceration of pulmonary tubercles, with perforation of the pleura,) and certain affections of the stomach, among which the dilatation consequent on scirrhus of the pylorus is the most frequent. In the latter case, the gurgling is produced in the abdomen; in the former it takes place in the thorax. A fold of intestine, considerably dilated, may also present this phenomenon, if succession be practised. We detected it upon one occasion, in a cyst of the ovary, which contained, as was discovered at the post-mortem dissection, pus of creamy appearance and very fetid gases, which, as it seemed to us, were probably produced by the putrefaction of this liquid. We should add that there are certain persons, whose digestion seems regular, in whom stomachal gurgling occurs on succession, after the ingestion of liquid aliment.

5. *Mensuration.* Mensuration, as the word imports, is that mode of examination, by which we endeavor to determine with more accuracy than is attainable by either sight or touch, the volume or length of certain diseased, or healthy parts. For this purpose we employ, according to the form of the parts, either an inelastic band, or a pair of callipers (*compas d'épaisseur*), with a scale divided into centimetres or lines; in many cases, the physician will find his fingers the most natural and available instrument for mensuration.

Certain precautions are necessary in the application of this method of exploration, so as to give to its results the accuracy which constitutes their utility. The first is a uniform degree of pressure in all the successive measurements; the second, a like uniformity and precision in regard to the posture of the patient, and particularly the position of the parts to be examined: the position should, if possible, be rectilinear, so that future examinations, made in exactly the same manner, may accurately exhibit the alterations, if any have supervened. If mensuration be applied to the head or the thorax, the patient should be either sitting or erect; his posture should be the horizontal, when the limbs and abdomen are to be measured. Another point of equal importance is to apply the instruments upon exactly the same points; the nipple and the umbilicus, in mensuration of the abdomen and thorax, may serve as *limits* (*jalons*).

Mensuration may be very advantageously applied in diseases which change the direction or the relations of one or more portions of the osseous system. It proves the existence of disorders which the eye would only lead us to suspect, and enables us to determine their extent and to trace their changes; on this account it is frequently employed by orthopedic surgeons. We cannot, however,

too often repeat how important it is in these cases, as well as in moulding in plaster, to maintain strict uniformity of attitude, in order that each ulterior examination may be conducted under precisely similar conditions.

In estimating the length of the lower limbs, mensuration presents some difficulties with which we should be familiar; lateral inclination of the pelvis might erroneously lead us to suppose elongation or shortening of a limb, did we not possess, in the ingenious process proposed by Professor Sanson, a sure means of ascertaining the direction of the pelvis,* and consequently of rectifying the error.

More difficulty is encountered in mensuration of the chest, than in that of any other portion of the body, on account of its alternate movements of dilatation and contraction and its frequent faulty conformation. The object of thoracic mensuration is, to determine whether there exist enlargement or diminution in the volume of either side. The following is the mode of procedure.

The patient should be seated, the arms separated from the body, and the hands clasped upon the head. The spinal processes of the dorsal vertebræ distinguish the median line posteriorly; a cord drawn from the superior extremity of the sternum to the ensiform cartilage marks it anteriorly. A graduated riband passed from one of these points to the other, across each side of the thorax, to the level of the nipple in the male, and just beneath the mamma in the female, enables us to ascertain accurately the comparative size of the two sides of the chest, in the alternate movements of inspiration and expiration. In aid of this process, which should be repeated at suitable intervals, the physician should follow out the changes induced by certain diseases in the volume of the chest, particularly by pleurisy with effusion.

This kind of mensuration, however, is not always sufficient for the appreciation of alterations in the volume, and, particularly, the capacity of the thorax. In some cases, indeed, where circular mensuration detects no difference in the extent of surface, simple inspection will show considerable antero-posterior depression of one side, and by means of the graduated callipers, and particularly the instrument which we have constructed for this purpose, † a difference of from an inch to fifteen lines in the antero-posterior diameter of the two sides may be detected, and, what is of more

* This process consists in letting fall, from the upper part of the body to the pubis, a vertical line represented by a cord reaching from the superior notch of the sternum, to the symphysis pubis, and crossing another cord extending from one anterior superior spinous process of the ilium to the other. Before measuring the limbs, we should so place the pelvis, as that the cords shall cross at right angles.

† This instrument, which is very similar to that used by shoemakers for measuring the foot, differs from it in having upon each of its branches, a movable plate ten or twelve lines in breadth, which, resting with a broad surface upon the chest, cannot, like the branch of the instrument, be alternately placed upon an intercostal space and a prominent rib, which condition would alter the results of mensuration and might lead to erroneous conclusions.

importance, it reveals a far greater change in the capacity of the thorax, than that occurring in cases where the extent of surface, only, is diminished. These two modes of exploration have enabled us to ascertain two facts, of considerable interest in the history of pleuritic effusions: first, that the chest, although much contracted after chronic pleurisy, may regain, in the course of years, its original dimensions; secondly, that in those cases where one side becomes contracted by reason of the compression and atrophy of the lung therein contained, the other side is enlarged, as if to supply the loss of power in its *companion*, in conformity with the known laws of pathological physiology. We shall mention a single fact, only, in support of each of these observations.

Dr. D., member of the Faculty of Paris, in the course of a chronic pleurisy of the left side, had dilatation of the side and subsequent contraction, as is observed in the majority of patients; by means of often repeated circular and antero-posterior mensuration, the various modifications of the conformation of the thorax were followed and appreciated. After several years, it was desirable to examine anew, in order to judge of the changes gradually wrought by time in the respiratory murmur, which had remained feeble, and also in the conformation of the left side, which, after seven or eight months of disease, was still much contracted. This last examination, made three or four years after the apparent cure of the disease, convinced us that the respiratory murmur had regained its normal type, and what was yet more surprising, that the left side had not only re-attained a size equal to that of the right, but that it had become larger, both in regard to its superficies, circularly measured by a riband, and in its antero-posterior diameter, measured by the instrument above mentioned. It is possible that this side may have been originally larger than the right.

The second fact relates to a phthisical young girl, who was brought to the clinical wards of La Charité with all the signs of pneumo-thorax upon the left side, and in whom suffocation seemed imminent. Liquid effusion succeeded to that of gaseous nature, and its absorption was very gradual; mensuration, at intervals of eight or ten days, established that the right side was progressively dilated, in proportion to the contraction of the left, although the contraction of the latter must have opposed the enlargement of the former. This patient survived the attack of pneumo-thorax, and died two years after, from the gradual progress of phthisis.

Mensuration of the abdomen is performed with a graduated riband, or with a plain one, upon which the result of each measurement is marked with ink. This exploration is particularly useful in abdominal dropsy, where it enables us to appreciate even the slightest modifications in the volume of the abdomen, and to deduce from thence our inferences as to the effect of the treatment employed. It is important, however, to remember that the volume of the abdomen depends both upon the quantity of liquid contained in the peritoneum or in a cyst, and upon that of gases and other matters confined in the intestines. The alterations which

supervene in the volume of the abdomen, do not, then, give us the exact measure of the existing modifications in the quantity of liquid contained in the abdomen: percussion must concur with mensuration in forming the opinion of the physician in such cases.

Mensuration is still farther applicable to certain tumors, which are sufficiently superficial to allow of being included between the branches of the callipers; although little employed, there are certain cases where it may be useful; a greater degree of precision in the appreciation of the changes which supervene in the volume of these tumors, furnishes prognostic and therapeutical indications which should not be neglected.

Finally, mensuration becomes a valuable means in the appreciation of the pelvic diameters, especially the antero-posterior, whose extent it is very important accurately to ascertain, with reference to parturition, particularly in deformed females. Several instruments invented for this purpose and called pelvimeters,* have been abandoned; the index finger is to be preferred, introduced to a sufficient depth into the vagina, to reach with its extremity the sacro-vertebral angle, while its base rests beneath the symphysis pubis; we can thus estimate this diameter within one or two lines.

6. *Percussion*. Percussion is that mode of exploration whose special purpose is to ascertain the degree of resonance presented by various parts of the body. It is by a species of percussion, likewise, that we obtain that *internal impulse*, caused by a sudden shock communicated to a liquid confined in a natural or accidental cavity (*fluctuation*), or to a mass of hydatids enclosed in a cyst (*hydatid fremitus*); but it is the first kind of percussion only, which will be here considered.

From the earliest times of medicine, percussion seems to have been employed in examinations of the abdomen: the term *tympanitis*, applied by the Greek physicians to considerable gaseous distension of the abdomen, puts it beyond a doubt that they had noticed, by means of percussion, the increase of resonance in this region. The utility of percussion, however, was then but limited: it barely sufficed to distinguish between dropsy and tympanitis. For this reason, Avenbrugger has very generally and justly been considered the inventor of this mode of exploration, which he was the first to apply to the study of thoracic diseases. Since the publication of his work, in 1763, and especially since its translation into French by the celebrated Corvisart (1808), percussion has become one of the most employed and most useful of diagnostic means: every day has added to its importance, either because it

* A new and very simple pelvimeter has been contrived, consisting of two pieces of wood, each one eighth of an inch square and eight inches long, fastened together in the centre by a pivot, so as to form a cross with equal legs. The lower extremity of one of these legs has a graduated transverse bar attached, upon which the other leg traverses. Thus, whatever space is ascertained by the expansion of the upper legs of this double compress, is marked by the separation of the lower. All that is required, therefore, is to introduce the upper end, closed with the finger, and to open it when in the pelvic cavity. — (*Medical Gazette*, Oct. 30, 1846). — TRANS.

has been more carefully studied and more extensively applied, or because the discovery of auscultation has given more precision to the value of the signs furnished by percussion. Finally, by the recent labors of many physicians, and particularly of M. Piorry, percussion, applied to the observation of abdominal disease, has furnished a new series of very useful diagnostic signs. (See page 151).

In order thoroughly to appreciate the changes wrought by disease in the resonance of the thorax, the physician should be aware that there is great variation in regard to the degree of resonance in different individuals, and that, in the same individual, percussion furnishes different results, according to the parts of the chest upon which it is practised. Broad chests, clothed with voluminous muscles, give, most generally, an obscure sound on percussion, whatever portion may be examined. In very thin persons, on the contrary, the chest resounds clearly, and is almost tympanitic throughout. In all cases the resonance of the thorax varies according to the regions: it is more clear beneath the clavicles, in the axillary regions and in the lateral portions; less so over the scapulæ and in the præcordial region; the latter returns an obscure sound, over a surface of from one and a half to two square inches, which indicates the space where the heart remains uncovered by the lungs; but in some persons, the heart, deeply situated in the mediastinum, has its anterior surface entirely covered by the lung, and percussion, practised upon the cartilages of the fifth and sixth ribs and the lower part of the sternum, gives an entirely clear sound. Below the heart, the thoracic resonance usually becomes clearer than anywhere else, which is owing to the presence of the stomach and its gaseous contents; on the right side, in a corresponding point, the sound is dull, which is referable to the liver. It has been said that the resonance of the right side was of deeper tone by reason of the greater volume of the lung; but we do not consider this difference sufficiently established.

Percussion has long been practised, directly, with the palm of the hand, or with the extremities of the fingers. This mode of percussion has the disadvantage of causing some pain, particularly in the mammary and abdominal regions, and it has become the practice to interpose some substance between the hand used in percussion and the part percussed, thus diminishing the pain, while the degree of resonance is the same or even increased. The latter kind of percussion is called *mediate*, the former *immediate*. Many instruments have been devised for mediate percussion. An ivory plate with projections, so that it may be firmly held (*pleximeter*), a piece of silver, or of caoutchouc, have all been proposed; but we prefer the index finger of the hand not used in percussion, (and this is usually the left,) because it can be better applied to the chest, and causes less noise than either ivory or metal, and also, because, as a general rule, the physician should not have recourse to instrumental aid, except in cases where the hand is insufficient. It has been suggested that the finger which serves as an interne-

diate body, be placed in supination, in order to percuss upon the softer palmar portion, which is less sonorous than the dorsal portion: we regard this modification as of little consequence, and employ the finger either in supination or pronation, according to the patient's position, without remarking any appreciable difference in the results obtained.

Whatever mode of percussion be preferred, certain rules should be observed in its practice.

It is a precept of general application in all modes of exploration, to commence by an examination of parts somewhat remote from the supposed seat of disease; this rule is equally applicable to pressure, palpation, percussion and auscultation: a previous examination of healthy parts admits of more accurate appreciation of the alterations, sometimes but slight, which take place in diseased parts. There are, however, some exceptions, and if the patient submitted to percussion or auscultation of the chest, be so feeble that he can with difficulty assume a sitting posture, even for a few seconds, it is preferable to examine the affected side first, lest syncope might prevent a more extended examination.

When either percussion or auscultation are practised, the patient should be in a quiet room, and those present should remain motionless and silent.

The parts subjected to percussion should be bare, or only very thinly clothed. The patient should be in a sitting posture during percussion of the thorax; the dorsal decubitus is suitable in percussion of the abdomen, and is admissible, also, for the front chest. The arms should be maintained in similar positions, hanging by the sides of the body, when we percuss in front or behind; raised, and the hands clasped upon the head, when the lateral regions are percussed. The physician may stand indifferently on the right or left of the patient for percussion of the abdomen; for that of the thorax, his position should be such as will enable the fingers of the most practised hand, which is usually the right, to strike at right angles and with uniform force upon corresponding points of the chest, on each side, either anteriorly or posteriorly; this is one reason for desiring persons who are not ill enough to be confined to bed, to sit on a chair when examined. If the results are at all doubtful, we should percuss comparatively, standing alternately at the right and left of the patient, and employing both mediate and immediate percussion.

It is generally best, in children and thin persons, to employ mediate percussion, with a single finger: the *medius* is preferable, which, by its greater length, naturally extends beyond the others. If the thoracic integuments are of considerable thickness, and especially if there be much adipose tissue, a greater degree of force will generally be necessary, and two fingers, as the *medius* and *index* united, should be employed, and sometimes, even all the fingers joined together and forming a line. Percussion should be gentle at first, being thus less painful and disagreeable to the patient, and also because, in this way, the sound caused by the percussing finger

is nearly null, and the internal resonance more easily appreciated. The force with which we percuss, may gradually be augmented, until we attain that degree which gives the most marked results.

Should nothing indicate existing lesions within the thorax, we limit our percussion of its several regions to three or four points; if we have any reason to fear concealed lesion, we should percuss much more frequently, and not renounce the idea of discovering some disorder, until we have examined, not only by percussion, but by auscultation, nearly every point of the thoracic surface.

Abdominal percussion is generally practised by tapping with the *medius* of the right hand upon the index finger of the left, which is made to glide successively from above downwards over the abdominal parietes, from the ensiform cartilage to the pubis, and from the margin of the ribs, on each side, to the ossa ilia. The resonance of the abdomen, like that of the chest, varies, in health, according to the thickness of the integuments and the flesh of the patients, and also according to the amount of gas contained in the alimentary canal, which may vary very much without constituting a morbid condition. The resonance of each abdominal region is generally proportionate to the diameter of the organs containing the gaseous fluid: in the normal state, the stomach gives the clearest sound on percussion, and the large, are more resonant than the small, intestines.

Abdominal percussion, in disease, conjointly with palpation and pressure, furnishes a great number of important signs. In cases of general distention of the abdomen, it assists us in ascertaining whether the swelling be owing to an accumulation of gas in the intestinal canal, to liquid effusion, or to a large, solid tumor entirely filling the cavity. In the first case, there is increased, in the two others, diminished, resonance: in one of the latter cases, fluctuation reveals liquid effusion; in the other, the absence of fluctuation and the greater resistance to pressure declare the existence of a solid abdominal tumor.

In cases where the abdomen presents only a partial tumefaction, percussion upon such a point, when a clear sound is returned, indicates that the swelling is owing to gaseous distention of a portion of the intestinal tube; when the sound is flat, the presence of a solid tumor or liquid effusion may be suspected as the cause, and in certain cases where there is a medium and variable resonance, a fold of intestine may be contained in the tumor, without constituting it entirely. Percussion, in conjunction with other modes of exploration, assists the diagnosis of peritoneal effusions, of tumors formed by the uterus and ovaries in females, by the bladder, spleen and liver in both sexes, and reveals the alterations effected by time and remedies in the course of these diseases.

Percussion, while it allows the ear to distinguish important modifications in the degree of resonance of diseased parts, imparts, also, a peculiar sensation to the finger, which may be valuable in certain cases. Thus, according to the observations of M. Piorry,

when a multilocular ovarian cyst exists in the abdomen, whose compartments contain various substances, each of them may present a different degree of resistance to the finger, and this phenomenon concurs with pressure and palpation in the determination of the seat and nature of the tumor.

7. *Auscultation*.—Auscultation is that mode of exploration whose purpose is to ascertain, by the mediate or immediate application of the ear to different parts of the healthy or diseased body, the various sounds which may be produced, and to appreciate their semeiological value.

Auscultation was at first applied by its inventor to the study of thoracic affections only, and we have previously seen (pp. 138, 166), what a number of important signs it has furnished in the diagnosis of diseases of the lungs, heart, and their respective envelopes. But Laennec himself was aware that it might be extended to other affections, especially to certain diseases of the middle ear, the Eustachian tube and the mastoid cells. Subsequently, a number of English physicians declared its utility in certain cases of peritonitis with formation of false membranes. MM. Mayor of Geneva, Kergaradec, and afterwards M. Paul Dubois and the younger Noegelé, have published interesting researches upon the application of auscultation to the study of pregnancy, and of certain conditions of the fœtus during intra-uterine life. Finally, some surgeons have declared, that in those deep-seated fractures where crepitation was doubtful, and in cases of urinary calculi where the shock of the sound against the foreign body communicated only an obscure and doubtful sensation, they could, by means of auscultation, distinctly hear the collision of the bony fragments and the light touch (*frôlement*) of the catheter against the surface of the calculus.*

Auscultation may be practised in two ways: either by the intervention of the acoustic instrument known as the *stethoscope* (*mediate auscultation*); or by the direct application of the unassisted ear to the parts we would examine (*immediate auscultation*).

Mediate auscultation was the only method advised and practised by Laennec, who found inconveniences in immediate auscultation

* The application of auscultation to the diagnosis of *cerebral disease*, was first introduced to the profession in 1834, by Dr. Fisher, of Boston. Subsequent and more extended researches led him to announce the existence of an encephalic bellows murmur in many cases of apoplexy and fracture of the skull, in addition to the diseases wherein it was first declared to be evident, viz., acute and chronic meningitis, encephalitis, during the accidents of dentition and in pertussis. The conclusions drawn by Dr. Fisher from his researches are the following: 1. The encephalic bellows murmur does not exist in the normal state of the encephalon. 2. It may be easily distinguished from the other sounds heard while ausculting the head, as the sound produced by the passage of air through the nares, by deglutition, location, and the cardiac pulsations. 3. Its seat is the arterial trunks at the base of the skull, when they are compressed by the brain; as occurs in effusion, or in inflammatory increase of volume of the organ. The calibre of the arteries being diminished, the circulation is impeded, and this, in addition to the resulting increase of friction, is the source of the bellows murmur. (See *American Journal of the Medical Sciences*. August, 1838.) — TRANS.

which seem to us fictitious.* In the last edition of this work, we asserted, that in our own experience, immediate auscultation had presented the same exactitude, in its revelations of the various auscultatory phenomena, as that by means of the stethoscope, even when employed by the most skilful. Fifteen years of observation have confirmed this opinion more and more, and it is entirely proved, that all the modifications of the respiratory murmur, and all the râles and abnormal sounds of which the lungs, heart and their enveloping membranes may be the seat, are as appreciable by the unassisted ear, as by the aid of the stethoscope. A certain degree of practice is requisite in both these methods of exploration; but skill is far more easily acquired in immediate than mediate auscultation. One who accustoms himself to the stethoscope, hears with more difficulty when he uses the unaided ear; another, (and this is our experience) more familiar with immediate auscultation, appreciates far better, by its means, the phenomena arising from the respiration, voice, and movements of the heart. But, supposing these two methods to be the same, should we not prefer the most simple?

Immediate auscultation presents still other advantages: 1. It requires less time, which, indeed, is of little importance in ordinary cases, but is not to be disregarded in those where the debility of the patient barely allows him to retain, even for a few minutes, the sitting posture, a circumstance of frequent occurrence. 2. The attention of the physician is not divided between maintaining the stethoscope in exact application to the parts he is examining, and the appreciation of the phenomena which he studies; it is not impossible, especially in the case of those who have not acquired great skill in the use of the stethoscope, that this instrument, being improperly applied, may lead the observer into error in regard to the phenomena which he is desirous of studying, while immediate auscultation would present no such difficulties.

* Immediate auscultation is equally inconvenient for the physician and the patient; disgust, alone, renders it impracticable in hospitals; it is hardly to be thought of with the majority of females, and in some, the size of the mammæ is a physical obstacle to its employment; these are Laennec's objections

To this we reply: 1. Immediate auscultation is less inconvenient for the physician than mediate, by reason of the firm support which the patient's chest affords the head; it is less painful for the patient, for the pressure of the ear is softer than that of a wooden instrument; 2. *Disgust* does not render any mode of exploration *impracticable*; it is also completely conquered by habit. 3. Immediate auscultation may be practised with such propriety that no reasonable female would object to it. 4. Considerable volume of the mammæ is quite as great a hindrance to the employment of the cylinder, as to that of the ear. 5. Lastly, to a final objection offered by Laennec, viz. "that all the parts of the observer's head, which touch the thorax, becoming so many conductors of sound, might cause the respiratory murmur to be heard in cases where it did not exist in the part situated directly beneath the ear, which might occasion serious error," we reply, that in no case have we seen this supposition realized, and that the most circumscribed lesions of the lungs have seemed to us as easily distinguished by the unaided ear, as by means of the stethoscope. In conclusion, we add, as confirmatory of our opinion, that, at present, the great majority of practitioners only use the stethoscope in those cases where there exists an obstacle to immediate auscultation. (See p. 292)

There are, however, some cases where mediate auscultation is preferable. In the examination of an œdematous chest, the pressure of the stethoscope displaces the serosity and enables us better to appreciate the phenomena of auscultation. At other times, the form of the parts prevents the accurate application of the ear, and renders immediate auscultation impracticable. In some phthical patients, for instance, where the emaciation is excessive, the considerable prominence of the clavicle and acromion process of the scapula does not admit the application of the ear to the thoracic parietes in the hollow circumscribed by these bones. The same is true in certain cases of rachitis, where, by reason of deformity of the thorax, the stethoscope alone can be employed; such is also the case, and for analogous reasons, in auscultation of the arteries; for if we except the cœliac axis and the arch of the aorta, to which the ear can, if necessary, be directly applied, we must use the stethoscope for all the others, either with or without its *supplementary portion*, or *plug* (*enbout*). Too strong pressure upon the artery with this instrument should be avoided; its effect would be to produce a bellows murmur in the vessel, which would simulate a morbid sound.

Mediate or immediate auscultation is practised as follows:

In the first place it is more convenient entirely to uncover the part about to be examined; the interposition of linen alone is not, usually, any obstacle to this sort of exploration; indeed, we sometimes observe that certain thick articles of clothing, and those doubled, do not always prevent the perception of auscultatory phenomena. We have often appreciated these phenomena with great accuracy through the thick garments worn in the cold season, and also, through linseed cataplasms entirely enveloping the thorax in children. On other occasions, the contrary is observed, and very thin clothing, as the corsets in females, or the starched shirt-bosom in males, almost wholly prevents the perception of phenomena afforded by auscultation. As a general rule, when nothing opposes, it is better to auscult the bare surface.

It is equally necessary, in order to the exact perception of auscultatory phenomena, that the muscles, interposed between the part examined and the ear of the observer, be entirely relaxed; their contraction might have the double disadvantage of altering the transmission of the sounds we wish to study, and of mingling with them other sounds arising from the muscular contraction itself.

In mediate auscultation, the stethoscope should be held like a pen, the hand being placed very near the part to be examined, in order to be sure that the instrument is accurately applied. If the patient be in bed, he should lie upon the back or assume a sitting posture, and the anterior parts of the chest should be examined in this position, the auscultator standing alternately upon each side of the bed; in the examination of the lateral portions and axillary regions, the patient should be inclined to the opposite side; in that of the back, he should sit up in bed, the body slightly bent forward, the arms folded, and the back turned toward the examiner.

If the patient be sitting up, it is better to rest upon one knee than to stoop, in the examination of the anterior and lateral parts of the chest.

In immediate auscultation, the patient should be sitting, either in bed, or upon a chair; the physician, standing beside him, applies the same ear successively over the whole anterior thoracic region, to the right and left, at corresponding altitudes; the right ear should be employed if he stand on the patient's left hand, the left, if on his right, so that the slightest difference presented by the auscultatory phenomena in corresponding points of the lungs or pleuræ may not escape observation. The patient's arm being next held in an elevated position, the physician applies his ear to the axillary space of the same side and to different parts of the lateral thoracic region; he passes to the other side to examine the dorsal region, the opposite axilla and corresponding side of the chest.

Acuteness of the sense of hearing is an important condition in the practice of auscultation, and the inequality of this sense, in the two ears, may be very troublesome to the auscultator, especially when the phenomena are indistinct. On this account, when both ears are not equally sensible of sound, (and this is perhaps the most common case,) the physician should employ exclusively the *most acute* in auscultation, and for this purpose he should stand successively on the right and left of the patient, so that he may examine with the same ear the anterior and posterior thoracic regions.

Whatever be the mode of auscultation employed, the respiration, cough and voice are successively examined, in all the points to which the ear or the stethoscope is applied. We generally commence by listening to the *natural* respiratory murmur, that is, the patient respiring in his usual manner and with no more than ordinary muscular force and rapidity. We thus ascertain the strength or feebleness of the respiratory sound, whether it be soft, or rude in character, and the râles by which it is accompanied in the alternate movements of inspiration and expiration, whose duration also is observed. If we do not distinctly perceive the respiratory murmur, we desire the patient to breathe more fully or rapidly, as if sighing; also, to cough, for, in certain cases, it is only during the long inspirations which precede, or follow the cough, that we distinguish the fine, dry crepitus, or the bronchial respiration of pneumonia. One or two questions should be asked him, that we may ascertain whether the voice have a ringing character. In auscultation of the anterior thoracic region, the patient should be desired to turn the head away from the auscultator. This precaution always has the advantage of avoiding the inhalation of his breath, and facilitates auscultation of the voice. It is absolutely necessary in immediate auscultation of the anterior and superior thoracic regions, it being very inconvenient to apply the head to those parts, except the patient turn his own in the opposite direction.

8. *Exploration with Sounds and Probes.*—Sounds and probes

have always been employed in tracing the course of fistulous ulcers, and the lesions of parts situated beneath these fistulæ, particularly the bones and cartilages; it is by means of metallic sounds, also, introduced into the bladder, that we discover the presence of calculi, a shock being transmitted, by means of the instrument, to the hand which directs it. For the purpose of ascertaining the form, degree, and exact seat of strictures in the urethra, soft bougies have been introduced, capable of receiving and retaining the form of the parts with which they are for a time kept in contact, and it has been supposed that the resulting impressions represent accurately the lesions existing in the urethra. But experience has shown that this mode of exploration does not merit all the confidence which some surgeons have too hastily ascribed to it. Flexible sounds are still employed in certain diseases of the rectum and œsophagus, for the discovery of foreign bodies or strictures not within reach of the finger. But the signs which may be deduced from the difficulty experienced in passing these instruments, have less value than those furnished by the introduction of the finger.

9. *Exploration by Specula.*—Various instruments have been imagined for the examination of deep-seated organs, to which the name *speculum** has been given: their purpose is to enable the physician, both to discover, by the eye, the many alterations which without their aid would be inaccessible to vision, and also to apply to the diseased parts the different remedies required.

Specula generally consist of hollow cylinders, with or without the central shaft intended to render their introduction more easy, and which is removed after the instrument itself is introduced. This shaft is indispensable when the speculum is used for the examination of a passage closed by a sphincter, as the rectum; it has hardly any advantage in the contrary case, especially in examinations of the vagina and uterus. The form of *specula* has been almost infinitely varied, but these numerous varieties depend upon two principal conditions; one class are made entire, and represent a conic cylinder, others consist of several pieces, which glide upon one another so that the instrument may be as small as possible when introduced, and that after its introduction it may be so far expanded as is compatible with the construction of the parts to be examined, and as much as the examination demands. The four-bladed speculum seems to us far preferable to all the others in examinations of the uterus, and even of the rectum; it has, moreover, this advantage, that we can, if necessary, detach one or two blades, for the better inspection of one side of the passage we examine. The two-bladed speculum is nearly exclusively used for the auditory canal. It is of great service in the diagnosis of various affections of which the tympanum is the seat. It has the advantage of straightening the curves of the meatus auditorius externus, and rendering more easy and complete an

* Mirror.

examination, which might, it is true, be made without the instrument.

The *speculum* intended for exploration of the rectum (*speculum ani*), is but rarely employed; its introduction is generally painful, and the impossibility of giving a sufficiently large diameter for the requisite admission of light to the parts exposed, without causing too severe suffering to the patient, restricts the number of cases in which it is useful, to those in which the disease is near the anus; the vegetations, fissures or perforations so often occurring in this portion of the intestine, can be observed by means of this instrument.

In uterine affections the speculum is far more frequently used, and its application is much more advantageous. The diagnosis of diseases of the cervix uteri has been much facilitated by its employment; lesions of this part can thus be appreciated by the eye, and their progress traced as readily as that of external affections. *Granular metritis*, a very frequent and unimportant disease, ranked by some surgeons (quite improperly, as we think) among the most dangerous of uterine diseases, under the term *ulcerations*, remained nearly unknown until the period when the speculum was employed. By means of this instrument, certain small, red agglomerated elevations have been discovered around the margin of the uterine orifice, forming by their union a circular or oval patch, well circumscribed, resembling the raspberry in color and inequality of surface, and very easily distinguished by these two conditions from the healthy portion of the os tincæ. Since the discovery of this affection by the speculum, the touch, previously unable to appreciate it, has furnished us with a sign by which, at present, we succeed in recognizing, or at least, are led to suspect it. If, when examining the surface of the os tincæ with the extremity of the finger, we find, within and around the uterine orifice, a soft and somewhat uneven surface, imparting a sensation comparable to that occasioned by touching the fabric known by the name of Utrecht velvet, while the eccentric portion of the os tincæ is firm and smooth, the existence of this granular affection can hardly be doubted, and we should immediately have recourse to the speculum to verify the diagnosis. The speculum enables us, moreover, to ascertain the nature of the liquid, frequently viscous and transparent, which escapes from the uterine orifice; we can also perceive, (especially if the instrument be slowly withdrawn and sufficiently expanded,) the alterations in the color, surface, and secretions of the vaginal mucous membrane.

The introduction of the speculum into the rectum and vagina, requires certain precautions. Previous examination of the parts should be made with the finger, and in those cases only where this first examination has revealed, or led us to suspect certain lesions, and no obstacle to the introduction of the speculum exists, is it advisable to proceed to one which is yet more repugnant to the patient. The cerate carried by the finger into the rectum or vagina, renders the introduction of the speculum more easy, and

this instrument is guided more accurately and carefully towards the diseased part when the finger has already ascertained the seat, and, in some instances, the nature, of the affection. It is hardly necessary to add, that a considerable contraction of the vagina or rectum would be an obstacle, and sometimes a complete one, to this sort of exploration. In the examination of the uterus, the position of the cervix being ascertained and sometimes rectified by means of the finger, the physician is more confident in regard to the direction which should be given to the speculum. If the touch discover cancerous degeneration of the vaginal or rectal parietes, we should abstain from introducing the speculum, or should use it with great circumspection; for there are cases in which the diseased parts are so softened or attenuated, that the introduction of the instrument, and particularly the development of its valves, might cause a rupture whose consequences would be exceedingly serious.

In all cases, even when the touch has not revealed any serious lesion of the parts into which the speculum is introduced, we should proceed to this examination methodically and carefully. The external surface of the instrument, and above all, its extremity, as well as the central shaft, if thought necessary, must be covered with a thick coating of cerate or some other unctuous substance. In examination of the rectum, the patient should lie upon the side: care should be taken in the introduction of the speculum that it be effected slowly and at a moment when the sphincter is relaxed.

In uterine examinations, the dorsal decubitus is preferable, the thighs should be flexed and separated, and the feet should rest upon a support some inches lower than the pelvis. In introducing the speculum, we should press moderately against the perinæal surface of the vagina, until it passes the pubic arch; the transverse line formed by the contact of the two vaginal parietes, which are seen in front of the instrument, indicates the direction which should be given to it. This line, receding before the instrument, conducts it to the *os tincæ*, which is easily recognized by its rounded form and the absence of the *rugæ* presented by the vaginal parietes. The blades of the speculum should then be gradually expanded, taking care that they do not touch the *os tincæ*, whose surface might be lacerated by them, and this organ comes fully into view at the extremity of the vagina. The mucus which frequently covers it may then be removed with pledgets of lint, applied by means of long forceps, and its color, form and volume, readily ascertained. If the day be dark, a candle may be placed before a teaspoon, whose concave surface will act as a reflector.

Exploration of far more deeply seated parts, has been attempted by means of very complicated *specula*: among these are the instrument proposed by Bambolzi, for the examination of deep cavities, particularly the stomach, and that invented by a mechanician affected with ulceration of the larynx, to enable his physician, M. Trousseau, to inspect the cavity of this organ; that proposed by M. Segalas for the urethra and bladder, to ascertain

the state of the mucous membrane and the actual existence of calculus, is of the same description. Hitherto, however, these ingenious inventions have remained nearly inapplicable.

10. *Examinations with the Microscope and Magnifying Glass.* Although the unassisted eye suffices, in most cases, for the observation of pathological phenomena we cannot doubt that the aid of those instruments, intended either to magnify very small objects, or to render visible, bodies wholly imperceptible to ordinary vision, possesses in all cases a certain degree of interest, and must, in some instances, furnish useful results.

We have previously seen that the microscope was necessary for the discovery of certain substances contained in urinary deposits, and for the determination of their nature. It may be equally useful in appreciating certain alterations of the milk or of the blood corpuscles, and, especially, the presence of pus in the latter liquid, when the precaution has been taken to prevent its coagulation by depriving it of its fibrine. But it should be remembered that the microscope requires long practice; this explains the often contradictory results obtained by different observers. For this reason we should not admit any observations as exact, unless they are verified a certain number of times, and by various persons accustomed to these researches.

The *magnifying glass (loupe)* is more easily and generally employed: it enlarges objects sufficiently to enable us to recognise the presence of the *acarus scabiei*, and, of course, the head of the tape worm. With this instrument, also, certain superficial erosions of the cornea may be perceived, and the species of some cutaneous affections, about to declare themselves, be determined at their commencement, etc.

11. *Employment of Chemical Reagents in the Diagnosis of Disease.*—There are some affections whose diagnosis is impossible without the aid of chemical agents: such is diabetes mellitus; and, also, that disease of the kidneys, in which the urine becomes albuminous. The assistance of chemistry is necessary in these cases, not only to determine the nature of the disease, but also to follow it in its progress, and appreciate the changes effected in its intensity by time and remedies, and finally, to verify, in some cases, the complete disappearance of a malady too often rebellious under every kind of treatment.

Among the diagnostic aids borrowed by medicine from chemistry, there are some easily employed, and whose application should be familiar to every physician: such are *tournesol* * and *turmeric paper*, for determining the acid or alkaline quality of liquids, and *nitric acid* for detecting the presence of albumen in the urine, or for precipitating the coloring matter held in suspension by the bile. When, on the contrary, it becomes necessary to undertake a series of experiments which require much time and great experience, it is both proper and indispensable to entrust such researches to persons who have paid particular attention to these branches.

* *Heliotropium Europæum.* — TRANS.

Having stated the principal means of exploration which the physician should thoroughly understand in order to diagnose disease, we shall in the next place describe the proper mode of examining patients.

§ III. *Proper Manner of examining and interrogating Patients, for the purpose of Diagnosis.*—When visiting a patient for the first time, the physician should commence by a rapid general examination. If the patient be up, his attitude and gait are the first objects of attention; if he be in bed and nothing prevent, it is of service to uncover him completely, in order better to appreciate his strength, flesh, stature, and the various phenomena afforded by external appearance, such as certain eruptions, mutilations and deformities. This first examination is almost always sufficient for the recognition of recent or chronic diseases, and, in some cases, even for concluding that an acute has supervened upon a chronic affection. If, for example, we visit a patient at mid-day and observe that redness of the face, increased heat, frequent pulse and prostration which belong to acute disease, the existence of this complication is, at any rate, very probable.

Successive examination of the various regions of the body may furnish very important signs, not only in external, but also in internal affections. In external diseases, simple inspection of the affected part is often sufficient to establish the diagnosis. In certain general affections, as scorbutus, syphilis, etc., the ecchymoses, pustules, maculæ and exostoses inform us, at a glance, of the nature of the disease. Cicatrices, also, deserve special attention, particularly when they occupy the superior cervical and the inguinal regions. The former are almost always the result of scrofulous tumors; the latter of a syphilitic bubo which has suppurated. The existing disease may have some connection with one or other of these affections, and it is so much the more important that the physician be aware of their former existence, because many patients neglect or voluntarily refrain from mentioning them.*

If the patient have lost a limb, a finger or one of the phalanges, the physician should never neglect to inquire the cause which rendered the loss of the part necessary. If it were white swelling which required amputation, this circumstance may have great weight in diagnosing an internal affection: if, for instance, the individual who has undergone this operation, present the symptoms of chronic pulmonary catarrh with emaciation, we should fear the existence of tubercles in the lungs; if his abdomen be

* The cicatrix resulting from a burn, a blister or an ulcer of long standing, deserves also the physician's attention, less, perhaps, in a diagnostic than in a therapeutic point of view. It is well known that the suppression of an issue and the healing of a chronic ulcer are often followed by the development of some grave affection, which does not yield except on the re-establishment, natural or artificial, of these discharges; the same is true of the maculæ which succeed certain herpetic eruptions.

harder and more voluminous than common, if the stools are frequent and liquid, it is to be feared that the mesenteric glands are the seat of incurable degeneration. Deformity of a limb or of the nose, etc., require the same questions. The physician should always know whether these deformities are congenital or acquired, and, in the latter case, what is the productive cause.

When disease of very different character from those ordinarily manifested makes its appearance in an individual with congenital malformation, we should ascertain if this disease existed from birth, or whether it appeared a long time afterwards. In the former case, we may reasonably suppose that the unusual symptoms complained of by the patient are owing to internal deformity, because observation has taught us that any deformity rarely exists alone: almost always there are several coexistent, and very often a faulty internal organization corresponds to that manifested externally.

External appearance, moreover, supplies us with certain other valuable diagnostic signs, in those who work the metals. It is not very uncommon to see patients brought to the hospitals with convulsions, delirium or coma, and consequently unable to give any information relative to the causes of such affections, and in whom the red color of the hair, beard and eyebrows, or the presence of a white powder at the root of the nails, make it almost certain that the illness is caused, in the former, by minium; in the latter, by carbonate of lead.

This hasty examination of the exterior of the body,* as we perceive, furnishes valuable diagnostic signs, especially when the physician wholly uncovers the patient. This we never fail to do, after the example of Corvisart and Bayle, in the male wards of the hospitals; and also in private practice, whenever it is possible. Every one perceives, in part, at least, the advantages resulting from this mode of examining patients; but in order thoroughly to appreciate them, it must be individually practised for a certain time. We have ascertained that it often enables us to dispense with a multitude of useless questions, and leads, in many cases, to a knowledge of circumstances, which, without its aid, would have remained undiscovered.

* A new means of diagnosis of the tuberculous diathesis, has been lately announced, derived from the external appearance (*habitude exterieure*). "When a child is observed with dark irides, colorless cheeks and darkish hair (the eyes often full and large, the eyelashes very long and close together), the forehead covered with close-lying hair, sometimes almost down to the eyebrows, its arms and back from the hair of the head down between the scapulæ, quite hairy, the hairs often being very thickly placed and dark in color, cachexia often being coexistent; in nine cases out of ten, such a child is tuberculous; either having tubercles already deposited, or liable to have them, in almost every organ of the body, the lungs especially. This hairy condition in a cachectic or unhealthy looking child, is a sign, generally speaking, of a constitution miserable in the extreme, saturated with scrofula." — (Dr. Wilshire. *Med. Times*, April 10, 1847.) Does not the confessedly existing *cachexia*, detract from the value of the concomitant alleged diagnostic sign, being *in itself* sufficient evidence of the tuberculous diathesis? Were these "hairy" children always stuffed with tubercles, when *not* cachectic in external appearance, the above would be an indubitable diagnostic sign. — TRANS.

Simultaneously with this rapid, but still careful external examination, the physician commences his questions. Two important points here present themselves: the mode of questioning, and the order in which questions should be asked.

When interrogating a patient, the physician should employ those terms only which are easily understood; he should assure himself, if doubtful, that he has been well comprehended, by repeating a second and even a third time, if necessary, the same question in different terms from those first employed. He should so manage that the patient shall state of his own accord, as far as may be, all that is necessary to learn from him, and, for this purpose, his questions should be such that they cannot be answered by simple *affirmation and negation*. Without this precaution, the physician renders the patient liable to state his case far otherwise than if he had told it without restraint.

It is equally necessary for the physician to pursue a regular course in questioning his patients; otherwise, he exposes himself to forget important questions and to repeat others, at any rate, needlessly, sometimes, injuriously to the patient,* and always to his own disadvantage. We say to his disadvantage; for the patient who notices this, will think his attention distracted, and from that moment his confidence in him is impaired. The number of questions necessarily varies according to the case. Generally, they should neither be too many nor too few; it is nearly as important to omit those which can be of no service, as not to neglect those that are necessary; the physician who wishes to know the minutest details, is more exposed, than another, to neglect essential points, or to forget them after having ascertained them. It is hardly necessary to add, that he who has not acquired the habit of seeing and interrogating patients needs to ask a great number of questions in order to form his opinion, while the experienced practitioner often attains this result, by the aid of signs furnished by the external appearance, and from limited information given by the patient or the assistants. So much the more important is it for the physician, on account of his reputation, to proceed methodically in the examination of his patients, because his fellow-physicians form their opinion of him from such grounds. "A physician who listens to the interrogations made by another to a patient, judges immediately whether he is well informed; and if so, he readily sees the reason of each question, why he passes from one to the other and the order in which they are asked. The most thoroughly informed physician," we should rather say, the most skilful, "is he who asks the fewest questions in diagnosing disease."†

The following has seemed to us the best order to follow in questioning a patient seen for the first time.

* The patient's interest sometimes requires that the number of questions should be very restricted: in diseases where silence is necessary, and particularly in inflammations of the respiratory and vocal organs, as in hæmoptysis, many questions would always prove injurious.

† Thèses, 1808, No. 138. *M. Falvard-Mont-Luc*.

1. We commence by asking his *age, occupation, place of residence*, customary diet and usual habits of life; whether he is habitually in good health or otherwise, and what illness he may have had. These questions are not always useful in diagnosis, but it is sufficient that they may be so in certain cases, to induce us never to neglect them.

2. We next ascertain the *period* of commencement of the existing disease; this should be determined with the greatest possible precision, especially in acute diseases: on this account the physician should rarely content himself with the patient's first replies, particularly in hospital practice. Indeed, the lower classes disregard the functional disturbance which occurs during the first days of the disease, and do not consider themselves ill, except from the moment when they have left their work, or abstained from food, or from the day when they experienced severe pain. We must, then, if we would be exact, review all the functions from the day when the slightest disturbance occurred, to the moment of examination.

In chronic diseases, as we have elsewhere seen, the transition from health to sickness is almost always insensible, and it is often difficult to determine, even approximatively, the period when the disease commences. The external appearance of the patient is then often at variance with his replies; it announces a disease already of long standing, while he complains only of some days or weeks of indisposition. It is generally easy to form a correct opinion, by asking the patient himself, or those who reside with him, whether previously to the period to which he refers the commencement of his disease, he did not experience some indisposition, some diminution of appetite, strength or flesh.

By the following questions, we endeavor to ascertain if the progress of the disease has been slow or rapid; if there have been *sudden* exasperations or *gradual* increase; if the symptoms have been the same from the invasion; if they have persisted without interruption, or have been manifested at intervals; whether some of those originally observed have disappeared, and whether others have supervened. When the patient is confined to his bed, we should not forget to inquire since when, and how soon after the first appearance of the symptoms, he has been obliged to keep his bed.

All commemorative circumstances are highly important in diagnosis: in many diseases, indeed, and particularly in those whose diagnosis is somewhat obscure, it is quite as much upon the succession of antecedent symptoms, as upon the concurrence of those actually present, that the physician's opinion may be founded. Unfortunately, many patients are not in a condition to give a clear statement of previous occurrences, and the physician is deprived of the information which might have been supplied by an accurate relation. When the patient's age or the disturbance of his intellectual faculties unfit him for replying to our questions, we must rely upon the attendants.

3. When all the preceding details are known, we pass to the

examination of the existing symptoms, which generally supply the most important diagnostic signs.

We first inquire if the patient has any pain ; if so, we ascertain its situation. We should not rest satisfied with knowing that it is seated in the stomach or in the cardiac region, etc. ; the vague sense of these expressions, as employed by persons unacquainted with medicine is too well known : we request the patient to point out with his hand the place where the pain is seated, and also, if it extend over a considerable surface, to circumscribe it and trace its course ; we inquire if it is superficial or deep-seated, continued, periodical or transient ; if its intensity be uniform, or if it increase and diminish at intervals, and under what influences ; if it be accompanied by a sensation of heat or cold, of weight, etc. ; we ascertain thoroughly the effect of pressure upon this pain, and ask the patient to what it may be compared.

We next notice whether there is any change in the color, volume, form and consistence of the affected part. This examination often requires the concurrence of the sight and touch ; it should be made with the most scrupulous attention, and can never be omitted without disadvantage. We also ascertain if any unusual pulsation or fremitus exist in the painful part, and, in certain cases, whether the natural resonance on percussion is preserved.

The three great splanchnic cavities present very different conditions in regard to exploration, relative to the various degrees of resistance offered by their envelopes, and also to the number and importance of their contained viscera. The cranial cavity being entirely surrounded by osseous walls, the enclosed parts are, as we may say, removed from our explorative means, and protected also from the action of external objects likely to prove injurious. It is in early infancy only, or from the results of diseases which have retarded ossification, or more or less completely destroyed a portion of the bony parietes of the encephalon, either suddenly or gradually, that the physician can see and touch the organs within, naturally inaccessible to direct explorative means, and whose diseases we can only appreciate from the supervening functional disturbance ; the difficult diagnosis of cerebral disease is thus explained, a diagnosis so difficult, that notwithstanding the very remarkable works published upon this subject during the last twenty years, the physician who does not wish to hazard his opinion, is frequently obliged to be extremely reserved in regard to the diagnosis of a cerebral affection, given at the patient's bedside. This uncertainty, however, does not ordinarily regard the existence of the lesion, but its peculiar form ; the cranium, containing but a single viscus and its enveloping membranes, presents in this respect favorable conditions for diagnosis, which compensate, in some measure, for the difficulties resulting from the arrangement of the investing tissues.

The thoracic parietes, formed both of osseous and soft parts, are so disposed, that while they prevent the application of some of our direct means of exploration to their contained organs, they still

admit many, by whose aid we can appreciate, and, as it were, touch, the greater part of the material organic lesions; they are susceptible of dilatation and contraction, either complete or limited, and these changes of volume afford us some valuable signs. But while exploration of this region meets with fewer obstacles, the greater number of contained organs renders it more difficult to determine the seat of the disease.

Lastly, the nature of the abdominal parietes which are formed posteriorly by the bony column which supports the trunk of the body, and elsewhere by fleshy tissues, renders every kind of exploration possible. But the number of organs contained in this cavity is far greater than in the two others: many among them concur in the same function, and from this very fact, the determination of the seat of disease presents more difficulties and is more frequently uncertain. We shall summarily state the proper method of examining each of these three great cavities, either as a whole or in regard to any of their component parts.

A. If the head be affected, it is sometimes useful to examine that portion of the cranium where the pain is felt, to ascertain if there be any partial tumefaction, and particularly, œdema and tenderness of the scalp, characteristic signs of erysipelas of this part; also if the bony parietes be intact, if the sutures are in their natural condition, etc.

We shall not attempt, in this place, to review all the symptoms which may be presented by the numerous organs enclosed within the cranium or situated upon the face. We shall restrict ourselves to the statement, that pain in the head and certain grave functional disorders of the encephalon, as delirium and convulsions, are far more frequently the indication of lesions in organs more or less remote, or the effect of certain deleterious agents, among which should be mentioned the virus of eruptive fevers, than the result of actual cerebral disease. We shall hereafter reconsider this point when treating of sympathetic phenomena, considered in their relation to diagnosis.

At present we merely observe, that pain, when confined to the right or left side of the head, *hemisrania*, properly so called, is almost constantly owing, either to a lesion of the corresponding cerebral hemisphere, or of its membranes, or, far more frequently, to disease of some of the parts included in the same half of the face, particularly the nasal fossæ, the frontal and maxillary sinuses, the teeth, the ear, or the eye.

B. When the vertebral column is the seat of pain, or when remarkable disturbance of the nervous action of the spinal marrow directs attention to that point, the spinal region should be examined, the patient either standing, or lying upon the abdomen. We are thus enabled to discover the various deviations and curvatures of which the spine may be the seat, the projection of one or more vertebræ accompanying Pott's disease, etc. Great importance has,

of late, been attached to the pain (more or less severe) produced in a limited portion of the vertebral column by pressure, made successively, with one or two fingers from the atlas to the sacrum, and this phenomenon has been cited as capable of revealing the existence of a lesion of the spinal marrow, or of its membranes, in the part corresponding to the seat of pain. The thickness of the parts comprised between the spinous processes and the spinal marrow, the slight depressibility of the vertebræ, and the unequal projection of the different spinous processes, lead us to suppose that the importance of this sign has been much exaggerated, and that new facts are necessary in order to determine its value. The same may be said of the hot sponge which Copeland* has proposed to pass along the spine, and which, it is asserted, would cause a burning sensation in that point only where the medulla was affected.

C. If the ear be painful, or if any remarkable lesion of the auditory sense arrest the physician's attention, the meatus auditorius externus should be examined, and in certain cases, it should be ascertained whether the meatus auditorius internus be permeable.

The examination of the meatus auditorius externus is not very difficult; it is often sufficient to straighten the passage by drawing the concha upwards and outwards, and thus gain a complete view of the whole internal surface, and even distinguish with sufficient precision the membrane of the tympanum, especially if direct solar light be introduced. If simple traction of the concha be not sufficient to bring the interior of the auditory canal properly into view, we employ the small instrument called *speculum auris*, whose two movable blades, separating after their introduction, straighten and enlarge the passage, and allow the eye to distinguish the different changes occasioned by disease, either in the membrane itself, or in the matter secreted by it; ulcerations and perforations of the tympanum are equally easy of discovery by means of this instrument.

Exploration of the meatus auditorius internus, which has been revived by the exertions of Dr. Deleau, presents considerable difficulty; on this account it is hardly ever employed, except by the small number of physicians who make the diseases of the ear, and their treatment, the object of special study. This exploration is performed by means of a small sound of metal, or preferably, of gum elastic, introduced into the nasal fossæ and directed so as to penetrate into the Eustachian tube. The obliteration of this canal is a frequent cause of deafness.

D. Certain peculiar phenomena, as the nasal alteration of the voice, difficulty of breathing through the nose, discharge of purulent or sanious matter from the anterior or posterior openings of

* *Observations on the Symptoms and Treatment of Diseases of the Spine.* London, 1815.

the nasal fossæ, or a fetid odor proceeding from these cavities, may require an examination which is managed as follows: the patient is turned towards the light, the head thrown backwards, one of the examiner's fingers pressed upon the lobe of the nose for the purpose of expanding the nostrils, or, preferably, a pair of dressing forceps is introduced, the separation of whose branches allows of a more complete inspection of these anfractuons cavities. We may, moreover, by means of an elastic sound, or of Belloc's instrument, sometimes ascertain the presence of a foreign body not discernible by the eye.

E. If the disease occupy the isthmus of the fauces, or the superior opening of the larynx or œsophagus, the following is the mode of examination.

1. For the examination of the isthmus of the fauces, we cause the patient to open the mouth widely: we depress the tongue with the index finger, with the handle of a spoon, a spatula or the instrument called *tongue depressor* * whose concave surface is accurately adapted to the convexity of this organ, and we expose the velum palati and its pillars, the uvula, tonsils and posterior part of the pharynx. In some persons, the epiglottis itself may be seen behind the base of the tongue, and, when inflamed, may come entirely into view, resembling a cherry with a median fissure.

We ascertain the alterations in these various organs, in respect to color, volume, moisture or dryness, the nature of their secretions, the coats or false membranes, granulations, ulcerations, and perforations which they may present. Certain individuals have the faculty of lowering the base of the tongue sufficiently, by muscular action alone, to expose completely those parts not visible in the majority of persons except by powerful depression of that organ; in them the inspection of the posterior fauces is as easy as that of the gums and tongue.

Some diseases, as angina tonsillaris and mercurial stomatitis, when at their height, entirely prevent the depression of the lower jaw, and, consequently, completely frustrate this kind of exploration. In these cases, where the lesions cannot be seen, we sometimes succeed in ascertaining, although with difficulty, by means of the index finger introduced into the month, between the slightly separated teeth, or in a space where they are wanting, increased volume of the tonsils, and their consistence, and occasionally to dis-

* The *speculum oris* (lately constructed by the French instrument-makers) combines the speculum with the *depressor linguae*; it consists of the latter, projecting from a hoop of the same metal, (usually the German silver, or the amalgam called "mailechort,") which is pierced with two or three apertures corresponding to the same number of buttons for retaining it at different graduations of its circumference, thus adapting it to the various sizes of the mouth in different individuals, and maintaining it permanently expanded during its insertion, thereby avoiding the signal inconveniences experienced when a spatula or the handle of a spoon are used for depressing the tongue. A far better view of the buccal cavity and posterior fauces is also obtained. — TRANS.

cover an abscess, which has in some instances been ruptured by simple pressure of the finger.

By means of the finger introduced as far as possible into the mouth, in certain cases of *angina œdematosa* [*œdema of the glottis*], we discover the tumefaction of the membranous folds extending from the epiglottis to the arytenoid cartilages and circumscribing the superior opening of the larynx. This examination excites in some patients so strong contraction of the pharyngeal muscles and so much retching, that it is wholly useless.

Exploration of the œsophagus and of that portion of the pharynx not attainable by the finger, must be practised with the œsophageal tube, which is introduced through the nasal fossæ, or preferably, by the mouth. We thus discover or suspect, in some cases, from the degree of resistance encountered, the existence of stricture or the presence of a foreign body, and determine their situation.

F. When local symptoms are manifested in the chest, we should endeavor to determine whether the disease occupies the parietes of the thorax, or the organs contained within it, and in the latter case, whether it be seated in the organs of respiration or circulation. To obtain this result, the conformation of the chest should be examined (p. 91), and percussion and auscultation employed, to ascertain whether the functional disturbance is connected with some material alteration of the organs contained in this cavity, and if necessary, to these results should be added those obtained by mensuration. We have previously mentioned the signs furnished by each of these modes of exploration; we will here enumerate, very briefly, the diagnostic signs acquired by the comparison of these three orders of phenomena.

The diminution or permanent absence of the respiratory murmur, without alteration either of the conformation or resonance of the chest, usually indicates that some internal or external body closes or compresses the trachea, and prevents the passage of air into the pulmonary vesicles. According as these phenomena manifest themselves in a limited portion, or over the entire surface of one side of the chest, or even of both, we conclude that the obstruction to the passage of air, occupies, in the first case, one of the bronchial divisions; in the second, the principal bronchus; in the third, the trachea or larynx.

If the diminution in the strength of the respiratory murmur be accompanied by increased resonance and dilatation of the thoracic parietes; if these phenomena are particularly manifest in the space included between the clavicle and the mamma, their concurrence reveals the existence of pulmonary emphysema.

Entire absence of the respiratory murmur over one side of the chest, with tympanitic resonance and dilatation of the parietes, generally indicates the existence of *pneumo-thorax*. If amphoric respiration and voice be added to the three previously mentioned phenomena, we can no longer doubt that there is a communication between the pleural cavity and some bronchial branch, from which

communication pneumo-thorax results. If metallic tinkling and gurgling on succussion be added to the former symptoms, and if the sound become flat at the base of the chest, over a space gradually extending upwards, *hydro-pneumo-thorax* undoubtedly exists.

If we find simultaneous diminution of resonance and feebleness or absence of the respiratory murmur, there is, necessarily, either alteration of the pulmonary parenchyma, rendering it less permeable to the air, or interposition of some solid or fluid body, which prevents both the transmission of the respiratory murmur, and also the penetration of air into the compressed lung.

If the sound be flat over *one entire side of the chest*, if the respiratory murmur and the resonance of the voice be null in that part, there is certainly liquid effusion into the pleural cavity, particularly if mensuration discloses a remarkable increase or diminution of volume in the affected side; in the latter case, absorption of the fluid is taking place. If the sound be obscure or flat *in one part of the chest only*, the corresponding changes are generally less marked, and, when present, almost always imply an organic lesion of a chronic nature. If this obscurity of sound be at the superior part of the chest, and in the sub-clavicular region especially, if there be a depression in that point more readily appreciable by the eye than by mensuration, if the respiratory murmur be feeble, expiration prolonged and somewhat rude, and particularly if some moist crepitus be heard, if the voice is more resonant there than on the opposite side, we must conclude that tubercular affection of the lungs exists. The flat sound, accompanied by bronchial respiration and resonant voice, may depend upon pulmonary induration or slight pleuritic effusion. In these two cases, mensuration is of no service, but *generally*, the resonance of the voice has a jerking character in pleurisy; the contrary is the case in pneumonia. In the latter affection, some crepitus is nearly always caused by the cough, in certain points where bronchial respiration is heard, and this constitutes a valuable diagnostic sign. Partial pleuritic effusion constantly occupies the lowest part of the chest; pneumonia may be manifested in any portion.

Dulness on percussion, with absence of respiratory murmur and resonance of voice, when limited to any part of the chest except the præcordial region, almost always denotes a circumscribed pleuritic effusion, the fluid being in moderate quantity (*d' une certaine épaisseur*); sometimes, a tumor or partial splenization of the lung.

Circumscribed and chronic effusion, and tumors, may cause a partial protrusion or *prominence* of the thoracic parietes, which is never produced by splenization. Tumors are almost always seated in the superior portion of the chest; most frequently they are formed by the dilatation of the large vessels; they then present pulsations isochronous with those of the heart, abnormal sounds and other characteristic signs. The distinction between circumscribed effusion and pulmonary splenization is often difficult: but

in one case, the possibility of changing certain conditions relating to the effusion by varying the attitude of the patient, and the moderate intensity of the dyspnœa and febrile action; in the other, (splenization,) the presence of pneumonic sputa and the gravity of the general symptoms are phenomena, which, in most cases, will supply the deficiency of signs furnished by exploration of the chest; effusion, moreover, constantly occupies the base of the chest; splenization may occur in any portion.

A flat sound on percussion, when confined to the cardiac region, indicates an affection of the heart, or of its envelopes. We should suspect pericarditis, if the affection be recent, if the dulness has been rapidly developed, if the sounds of the heart are deep and obscure; if opposite phenomena are observed, our diagnosis should be hypertrophy, particularly if there be also considerable *prominence* of the præcordial region, strong impulse and very distinct bellows murmur.

G. When the symptoms are referred by the patient to the abdomen, that part should be thus examined. The patient should assume the dorsal decubitus, the head be raised by a pillow, the thighs flexed upon the pelvis, the legs upon the thighs, and the knees slightly separated. We ascertain by ocular inspection, or by means of the hand, the changes of form and volume which may be presented, either over the entire surface of the abdomen, or in one or more points, especially in those where hernia or simple dilatation of herniary apertures may exist. Pressure and palpation are next resorted to, conformably to the foregoing rules; we percuss, and if necessary, employ mensuration and touch, should any circumstance indicate the utility of these explorative means. In those cases where the abdomen is distended by an enormous quantity of serous fluid, it often happens that we cannot exactly judge of the condition of the viscera, or discover the lesion which causes the dropsical effusion until after the evacuation of the fluid by tapping.

Many important diagnostic signs are furnished by abdominal exploration. It alone, enables us to ascertain the accumulation of serous fluid in the peritoneum, of gas in the intestines, and the various tumors resulting from hypertrophy or degeneration of the abdominal viscera. The latter are characterized by certain conditions with which we should be acquainted, because they constitute actual pathognomonic signs; thus, the liver and spleen almost constantly preserve their original form in the different diseases which augment their volume, and no other part, when morbidly enlarged, assumes the form of the liver or spleen; consequently, whenever we discover in the abdomen, a tumor occupying the right hypochondriac and the epigastric region, extending upwards beneath the ribs, and whose inferior border is firm, angular, running transversely, but more often obliquely, from left to right, and from above downwards, we may be sure that it is formed by the liver. A tumor which occupies the left side, extending somewhat

beyond the false ribs. whose form is a segment of an ovoid, whose internal border is rounded and angular, and vertical in its direction, must be formed by the spleen, particularly if no general transposition of the viscera exist, of which an examination of the præcordial region may convince us: if the heart be in its usual situation, we may, as a general rule, conclude that the liver and the spleen are so, likewise. The bladder in both sexes, the uterus, and, to a certain extent, the ovary in the female, present in their development, certain peculiarities of form and position, which admit of easy recognition, at least in the majority of cases. Tumors formed by masses of fæcal matter in the large intestines, have a form similar to a string of beads (*forme de chapelet*), which generally renders their diagnosis easy. Those formed by the kidneys have no peculiar shape, and the depth at which they are seated, does not allow us to reach them, except they have acquired considerable volume. We may discover these tumors by seizing the sub-costal region with the whole hand, the thumb resting upon the lumbar portion, and the fingers upon the side. Tumors developed in the stomach and intestines are never uniform in volume, form or seat, and are frequently movable. Those of the pylorus are found, in certain patients, very far from the region commonly occupied by this extremity of the stomach; they have occasionally been discovered near the umbilicus, and even in the right iliac fossa, nearly in contact with the anterior, superior spinous process of the ilium. The iliac fossæ are very frequently the seat of phlegmonous tumors, to which the attention of physicians has been particularly directed by the researches of Dance, and MM. Mélier, Mérière and Grisolle. Lastly, the abdomen is sometimes the seat of pulsative tumors, some of which are formed by aneurisinal arteries, others derive their pulsation from a neighboring artery. Auscultation should be practised in these cases, as well as in those where there is doubt as to the existence of pregnancy. It is also interesting (as is evident from the researches of many English physicians, particularly Bright, Corrigan, Beatty and Stokes) in certain forms of peritonitis, especially in those where the abdomen contains a more or less resistant tumor; in these cases a slight *friction* sound is heard, indicative of the development of false membranes upon the internal surface of the peritoneum.

H. In scrotal examinations, it is important to ascertain whether the disease, whatever be its nature, occupies the envelope or the contained organs, and among the latter, whether the epididymis, testicle or tunica vaginalis are affected; to pressure and palpation, should be added the weight [act of weighing, "*ponderation*"] of the tumor, and we should ascertain particularly, whether it be transparent, by placing it before a bright light; tumors of the testicle are heavy and opaque, hydrocele is light and transparent; an *explorative* puncture (as it is called) is sometimes indispensable, to render the diagnosis positive, when examination of the

tumor will not justify us in asserting that its contents are fluid. In certain cases of scrotal enterocele, percussion elicits a clear sound, and assists our diagnosis.

I. In cases where the rectum is the seat of the local symptoms, in either sex, or the organs of generation in the female, ocular inspection is necessary; when the disease is external, the anus or vulva should thus be examined, the soft parts which surround each orifice being separated as far as is necessary; when internal, the finger or speculum should be introduced into the rectum or vagina, according to the rules and precautions previously indicated.

J. The examination of the limbs is not always so simple as we might, at first, suppose. Not to mention the difficulty of diagnosis, in certain cases of fracture without displacement of the fragments, and of some chronic dislocations, we would point out, as worthy the attention of the physician, the frequently trifling difference in the volume of the limbs, in their length, contractility, sensibility, heat, freedom and extent of motion, and in the volume and direction of the bones which support them. Partial or general swelling of the limbs, the various tumors of which they are the seat, either in their continuity or contiguity, and the external lesions to which they are even more exposed than the body, supply the physician with numerous phenomena to be discovered only by examination of the affected part.

Having finished the examination of the region to which the pain is referred, we should ascertain the functional condition of the corresponding parts. For example, if the patient complain of pain in the chest, we examine the respiration in regard to its frequency, its equality and the mode of dilatation presented by the thorax; we learn whether there be cough; and if there be sputa, we examine them. Before passing to general symptoms, which are less interesting, we should ascertain the functional condition of those organs more particularly sympathizing with the affected parts. Thus, when an acute pain in the lumbar region and along the course of the ureters, with suppression or alteration of the urine, leads us to suspect inflammation of the kidney, the local symptoms having been examined, we should inquire if there be retraction of the testicles and vomiting, because these two sympathetic phenomena are important signs of nephritis. The same is true of vomiting in peritonitis, etc.

If the patient experience no local pain, and complain only of some functional disturbance, as cough, diarrhœa, partial debility, etc., we first examine everything in any way connected with the function principally involved; the general symptoms are afterwards considered.

In those cases where the patient complains only of general indisposition without particular pain, of universal derangement of the functions without any marked disturbance of any one in particular, we examine them all in the order we have followed in the general account of symptoms.

The physician should at first direct his attention to the expression of the patient's physiognomy, and to his attitude. He should then endeavor to appreciate the muscular force, either by questions or by certain movements required of the patient. If the voice seem unnatural, he learns from the assistants what changes it may have undergone; he afterwards inquires into the condition of the various sensations, the moral affections, the character of the patient, his intellectual faculties, and his sleep; after which he examines, successively, the nutritive functions.

The interior of the mouth, and particularly the tongue, is next examined; the patient is asked if he is hungry or thirsty, if deglutition be free, if he experience nausea or eructations; if he still takes food, and in what quantity, if digestion be easy, if uncomfortable sensations, oppression or somnolency occur after eating; if there are borborygmi; the physician should ascertain whether the abdomen be supple, the alvine evacuations regular, and what is the nature of the excretions. He next notices the respiration and the different respiratory acts, then the circulation, heat, exhalations, and secretions, and finally, if it be necessary, inquires into the state of the generative functions.

In this complete review of the functions, the physician should endeavor to fix the period at which each symptom appeared, and the successive changes it has manifested from its appearance to the moment of examination.

To the examination of symptoms, the difficult, and often unfruitful, search for the productive causes of disease should always be added. The knowledge of causes, when it can be gained, confirms or rectifies diagnosis in obscure cases, and is not without interest in others. Consequently, we should not neglect to ask whether the affection whose nature we endeavor to determine, be hereditary or acquired; if this be the first attack or otherwise; if it be owing to specific causes whose action is manifest, or to predisposing causes, whose action is uncertain; if it have any connection with previous diseases, and what those diseases have been.

The effect of remedial measures may also contribute to decide our opinion, particularly when the disease under consideration is of that limited number arising from specific causes; the specific remedy employed, becomes, in such cases, a sort of touch-stone which reveals their nature. This is particularly observed in syphilitic affections, and in some obscure forms of intermittent diseases. In these cases, and in certain others also, diagnosis is almost entirely founded upon the knowledge of the *cause* which has produced the disease.

§ IV. *Principal component Elements of Diagnosis.*—If there are certain diseases whose nature is simple and whose effects are limited to the parts they occupy, as wounds, or fractures not presenting those conditions to which surgeons have quite improperly applied the term complication, it is otherwise in most affections, especially in those constituting the domain of medical pathology. Here, indeed,

the disease is nearly always complex ; there is predominant lesion of one organ, simultaneously with lesions of all the others, or at least of those more particularly connected with the one principally affected. This more or less general disturbance of the organism sometimes precedes the local lesion, announces it and perhaps concurs in preparing its development ; in other cases it is associated with it ; both may appear simultaneously. In all these cases the disease is by no means simple, and the physician who sees in erysipelas or pneumonia, only the material lesion of the skin or pulmonary parenchyma, would not have an accurate idea or a thorough knowledge of either disease ; for such knowledge necessarily comprehends, on the one hand, the seat and nature of the lesion, its extent and degree of intensity, and on the other, the accompanying symptomatic phenomena, local and general, their form, whether acute or chronic, the presence or absence of febrile reaction, the energy of that reaction, the period attained by the disease, the peculiar type it assumes, etc. ; these are, indisputably, so many conditions constituting indispensable *elements* of diagnosis, and should be carefully examined in this connection.

When diagnosis is thus thoroughly considered, we see how incomplete and restricted was the opinion of certain physicians of the anatomico-pathological school, who founded their diagnosis of disease entirely upon material organic lesions, so that, in their opinion, every thing depended upon determining what organ was affected, and in what manner. The ancients were more excusable, when, strangers as they were to the knowledge afforded by necroscopy, they saw, in disease, only the apparent functional disturbance, which, indeed, they observed with admirable sagacity.

A. Determination of the Seat of Disease.—This includes several questions which will be successively considered.

1. Which is the diseased organ. 2. To what extent is it affected. 3. In certain cases, which of its elementary tissues is particularly diseased.

1. *Which is the diseased Organ?*—The senses alone are sufficient, in a certain number of diseases, to inform us which is the affected organ ; in others this knowledge cannot be acquired, except by the aid of those signs which reason deduces from the phenomena furnished by the senses ; in still other cases, the seat of disease remains obscure through life, and sometimes even after the necroscopy has afforded us the most complete investigation, and one seemingly the most likely to dispel every doubt.

When the disease is external, as herpes zoster or erysipelas, its seat is so evident, that unprofessional individuals can perceive it equally with the physician. The same is true of the numerous diseases of the skin, and of the majority of those seated near the point of union of the skin and mucous membranes ; conjunctivitis is recognised at sight, as also ulceration and puffiness of the lining membrane of the mouth, swelling of the tonsils, excrescences developed near the nostrils, upon the glans penis, the vulva and

around the anus. We may, moreover, as regards the ascertaining their seat by means of our senses, compare these diseases with certain affections in which the diseased organ, originally out of sight in one of the splanchnic cavities, as the thorax or even the cranium, causes absorption of their parietes by reason of its subsequent morbid growth, and shows itself beneath the skin. *Fungus* of the dura mater and aneurism of the arch of the aorta, become, in this way, external diseases. Certain diseases of the abdominal viscera, may also be subjected to the *touch*, especially when they occupy the liver or spleen, which organs, as we have previously observed, almost always retain their *form*, whatever may be their increase of volume. As we have elsewhere remarked, by the introduction of the finger into the vagina or rectum we ascertain the seat of various affections, and, by the use of the speculum, vision assists the sense of touch. In nearly all cases of fracture, the deformity of the limb, the mobility of the fragments and the distinct crepitation, are all phenomena clearly indicative of the seat of injury.

There are, however, many diseases, particularly among those appertaining to internal pathology, where the senses alone are insufficient to determine what organ is affected. If the disease be one of that class which are of sufficient severity to terminate occasionally in death, and which present constant lesions on dissection, the comparison of the phenomena observed during life with the lesions discovered, after death, in analogous cases, generally enables the physician to declare without hesitation its seat, and the kind of alteration presented by the affected organ. When, therefore, in an unlimited number of cases, after a determinate series of symptoms, post-mortem examination reveals, in the same parts of the body, a lesion of constant occurrence, we reasonably conclude, that whenever the same phenomena reappear, we shall find the same organ similarly affected.

There are, however, certain diseases, some of which are severe and others of slight importance, for whose elucidation pathological anatomy furnishes us far less assistance. If the individuals affected by them die, either from the actual disease or some coexistent affection, nothing is discovered explanatory of the previously observed phenomena, either because the accompanying lesions are not appreciable by our senses, or because the requisite attention has not, thus far, been devoted to researches of so delicate a nature. Many individuals die instantaneously, or in a very short time, with apoplectic symptoms, tetanic convulsions, and hydrophobic spasms; some even die paralytic, and no lesion whatever is discovered at the necroscopy. If an individual affected with acute rheumatism, or some nervous disease, be attacked by another and a fatal malady, in the majority of cases, no appreciable alteration is met with in the parts to which the pain was referred. Necroscopy has hitherto proved insufficient to determine the seat of these diseases, and certain notions upon this point have been derived solely from the often contestable laws of physiology.

Physiology acquaints us with the functions proper to each of our organs. Disorder of a function leads us to admit a certain lesion in the organ to which that function belongs. Thus, when severe pain occurs without swelling, redness, or any other appreciable change in the affected part, we judge that the disease is seated in the nerves or brain, because they are the organs of sensibility. If this pain increase on motion, and diminish or cease by rest, if its intensity is constantly proportionate to the force of muscular contraction, we conclude that the affection is seated in the organs of motion, that is, the muscles. But here there is no absolute proof; the concurrence of the nerves and muscles being necessary to motion, it is difficult to distinguish whether the disturbing cause be in the muscular or nervous system, or in both together. This distinction is equally difficult in convulsive diseases, of which the muscles are the immediate agents, and in which the nervous system plays, incontestably, a great part. Our previous and future remarks upon sympathy will prove more clearly into what error we should be led, if we attempted, in all cases, to determine exactly which is the affected organ, from functional disturbance alone.

The difficulty of fixing the seat of diseases becomes still greater in those characterized by general functional disturbance, without primary local affection. We mean fevers, and especially intermittent fevers; for if there still exist conflicting opinions among physicians in regard to the constancy and value of lesions in continued fevers, they are agreed in regard to the impossibility of determining the seat of disease in intermittent fevers. The external appearance is changed, the circulation, heat, digestion, secretions, sensations, sometimes even the intellectual functions, respiration, locomotion and the voice, are simultaneously affected for a certain number of hours, the disturbance ceasing with the paroxysm. Where in such a case is the seat of disease? Is it in the spleen, as some assert? In the stomach, the intestines, or the mesentery? Is it in the nervous system generally, or in one of its divisions? In the blood or some other of the fluids which enter into the composition of the human body? All these opinions have had or still have their partisans, but none of them has been established upon a basis sufficiently firm to convince us of its truth. The interesting researches in pathological anatomy, made some years since by Dr. Bailly (too soon removed from science and society), in a country where intermittent fevers are sufficiently severe to terminate frequently in death, have left the question of the seat of intermittent fever undecided; a disease in all other respects so well understood, that notwithstanding the obscurity which prevails in regard to this point of their history, it is, at present, of all the diseases to which man is subject, the one whose diagnosis is generally most easy, and whose treatment shows most incontestably the power of our art. So true is it that the most important thing in medicine, and even in diagnosis, is not always, as has been asserted, to determine which is the affected organ, and how it is affected.

2. *The Seat of the Disease being known, what is its Extent? —*

In those cases where the physician succeeds in discovering which is the diseased organ, it is desirable to determine to what extent it is affected. If we consider how much its *extent* influences the gravity of the disease; what difference there is, for instance, between erysipelas limited to one cheek, and that which occupies the face, and simultaneously the entire scalp; between partial pemphigus, and that which is nearly general; between variola discreta and variola confluens (for in the latter, it is, as it were, a simple difference in the extent of the affection, measured by the number of pustules); between inflammation limited to a single point in one lung, and double pneumonia; between partial peritonitis, a disease generally attended with little danger, and general peritonitis, which is most frequently mortal, we cannot misunderstand all the importance which the question of extent should have, in deciding our opinion of a disease.

The extent of those diseases which are seated at the surface of the body is easily perceived. In these cases, however, the affection is not always confined to the skin. Many affections styled cutaneous, and particularly those depending upon a contagious principle, attack the skin and certain of the mucous membranes simultaneously, and, by the febrile action they excite, often produce lesions of considerable severity in the viscera themselves.

It is generally difficult to determine the extent of the disease in internal affections; this difficulty, however, is not always insurmountable. Thus the exploration of the abdomen often enables us to determine whether the liver is diseased throughout, or in one lobe only, also, to what extent the spleen is enlarged; examination of the chest enables us to distinguish whether pleuritic effusion occupies a part or the whole of the pleura; if pneumonia, limited at first to a portion of the pulmonary parenchyma, invade daily a greater extent, and whether at a more advanced period it becomes limited in its seat, and diminishes in intensity at the same time. Finally, there are certain cerebral affections, hæmorrhage in particular, in which we can, to a certain extent, estimate the volume of the apoplectic clot, from the intensity of the symptoms, and consequently the extent of the rupture of the cerebral parenchyma. There is, then, a certain number of internal diseases, in which we can judge, approximatively at least, of the extent occupied by the material lesion.

3. The study of the seat of diseases sometimes extends to determining which of the *elementary tissues* is primarily affected. But we should remember that this sort of research belongs to that molecular anatomy, in which imagination too often supplies the insufficiency of the senses, and whose results must be received with great circumspection.

There are, however, some diseases of the skin whose special seat, whether in the mucous layer, or in the follicles, is now scarcely contested; among these are *acne*, which seems to occupy the follicles exclusively, and those affections known by the name of *maculæ* and *ephelides*, which, being characterized by alterations in the

color of the skin, can hardly occupy any other part than the mucous layer, in which the secretion of coloring matter takes place.—Every one, at the present day, is aware that in typhoid fever it is not the intestinal mucous membrane which is affected, but the follicles, either agminated or isolated, which lie between this membrane and the cellular coat, and which occupy particularly that portion of the ileum nearest to the cæcum. But if we pass from the skin and mucous membranes to certain other organs in which the elementary tissues are less distinct, as the liver, the kidney, and even the lung; if we wish to determine, in this latter organ, the tissue in which tubercle is formed; if we attempt to discover in a liver affected with cirrhosis, or in a kidney affected with Bright's disease, the hypertrophy of one element of these organs and the atrophy of the other, we are liable to leave the domain of positive anatomy, and to enter upon a class of questions which are hardly susceptible of a definite solution.*

B. *Determination of the Lesion.*—Having explained in what way the physician succeeds in discovering *which is the affected organ*, and to what extent it is affected, we will now consider the second point, viz. the *manner in which it is affected*, which comprehends both the *nature* of the lesion and the *progress* it has made.

* The correctness of this remark may be questioned, if we rightly understand the author's assertion. Can we avoid the conclusion that many lesions of the kidneys have been so accurately described by different authors, that in respect to them, we are in "the domain of positive anatomy," and that many questions have received that "*definite solution*" of which they are declared "*insusceptible*" in the text? The elaborate researches of Dr. Bright upon the pathological lesions exhibited by the kidneys, when affected by the disease that bears his name, surely announce to us many points within "*the domain of positive anatomy.*" Dr. Prout, in his valuable work on Stomach and Renal Diseases, declares that "the post-mortem phenomena, when studied in connection with the condition of the urine and the constitutional symptoms, are quite sufficient, in a practical point of view, to regulate our proceedings and to show us in general, what we can and what we cannot accomplish."—(p. 178, 4th English edition.) The admirable work of M. Rayer, from which large quotations are made by Dr. Prout, (*loc. supra cit.*) may be mentioned in proof of how much "positive anatomy" can be claimed at the present time, in regard to renal lesions: (*Traité des Maladies des Reins Atlas*.) Nothing can be more minute, but at the same time, what can be more accurate, than the description of the morbid appearances of the kidney affected with granular degeneration.¹ (Prout. *Op. cit.* pp. 180, 181. Rayer's Post Mortem Classification.) The hypertrophied and atrophied tissues are clearly de-

¹ This term, which originated with Dr. CHRISTISON, has, of late, been objected to by some authors. Dr. WATSON, in his Lectures on the Principles and Practice of Physic, (Vol. II. p. 572, 2d Eng. edit.) says, "some call it (Bright's disease) *granular degeneration* of the kidney, but the epithet granular is not always applicable." Dr. COPLAND describes it under the name of *Cachectic Nephritis* (Med. Dict.). Dr. BRIGHT himself termed it *granular disease* of the kidneys. Drs. QUAIN and WILLIAMS, however, in their late descriptions of the renal lesions observed in this disease, give, as the second of their three divisions, "the truly *granular* or atrophied kidney. (WILLIAMS, Lond. Med. Gaz. 1845. QUAIN, Lond. Lancet, Feb. 1846.) Dr. GEORGE JOHNSON has lately maintained that the so-called *granular*, is, in fact, a "*fatty*," degeneration of the kidney, analogous to that of the liver." (Lond. Lancet, Jan. 1846.) GLUGE, in his "*Atlas der Pathologischen Anatomie*" declares the same opinion, and distinctly objects to the terms "*albuminuria*" and "*granulated kidney*." His researches were made in 1840. (See Ranking's Abstract of Med. Sciences, Jan. to July 1847, p. 183.) The question being still undetermined, we have ventured to employ the term "*granular degeneration*."

1. Here, as in the former case, the disease may be upon the surface of the body, and then, by the direct use of the senses, particularly of sight and touch, we can often recognise at once, both the seat of disease in the skin, in the subcutaneous cellular tissue, in the superficial lymphatic ganglia, in the mammary gland or in the testicle, and its inflammatory, scirrhus or tuberculous *nature*. If the affection be internal, it is in like manner by the comparison of all the symptoms of the actual disease, and of the lesions observed at necropsies, in analogous cases, that we succeed in discovering the nature, as well as the seat, of the lesion. In the examination of a patient affected with pneumonia or peritonitis, for instance, the physician cannot isolate these two questions, he perceives the seat and nature of the lesion simultaneously. This is generally the case; the same modes of investigation lead to the solution of both questions, and the solution of one often implies that of the other. There are, however, frequent occasions when these two questions become, at the bedside, entirely distinct; so that in certain cases, the seat of the lesion is evident and its nature uncertain, and *vice versa*. It is quite common, for instance, to recognise satisfactorily by the peculiar form of a tumor developed in one of the hypochondria, the existence of an affection of the liver or of the spleen, and not be able to determine the kind of alteration of which those organs are the seat. At other times, the nature of the lesion is manifest and its seat obscure; thus, in some cases, one of the iliac regions, the right, for instance, becomes, in a short time, the seat of an acute pain which is exasperated by pressure; by palpation, a resisting, ill-defined tumor is discovered; fever, nausea and vomit-

finied, as also are the periods when these changes occur; and although, with Dr. Prout, we may consider the practical aid derived from the *precise* knowledge of post-mortem phenomena as exhibited in the kidneys, of but little importance, still they are far from valueless, and can by no means be said to constitute "an order of questions insusceptible of definite solution."

The discoveries of Kiernan, while they add so much to our knowledge of the anatomy of the healthy liver, have also tended to give more minuteness and accuracy to the details of the pathological lesions it displays. In cirrhosis (which is mentioned by M. Choinel as a disease in which there can be no *precision* in regard to the *seat* of lesions observed after death), the *minute* descriptions of pathologists *seem* to be founded upon "positive anatomy," and if not so, are worthless. The conclusions drawn by Dr. Budd (*Diseases of the Liver, Cirrhosis*, p. 113, Eng. edit.) in regard to the appearances generally presented in cirrhosis, are valuable in support of our position. He remarks, "The ordinary appearances in cirrhosis, and the changes just described, (atrophy and diminished weight of the liver, notwithstanding the existence of an adventitious tissue, formed of coagulable lymph; and nodular formations composed of a yellow matter, seen by the *microscope* to consist of the original lobular substance of the liver, drawn into these round nodules by the previously mentioned tissue,) seem the consequence of *adhesive inflammation in the areolar tissue* about the small twigs of the portal vein, by which serum and coagulable lymph are poured out;" etc. etc. The employment of the *microscope* in these examinations, often explains problems previously "*insoluble*," (as is seen in the above statement) and gives the highest importance and daily increasing accuracy to that "*molecular anatomy where the insufficiency of our senses is too often supplied by the imagination*." (Vide p. 315).—TRANS.

ing supervene; the inflammatory nature of the tumor is evident, but where is its peculiar seat? Is it developed in the cellular tissue of the iliac fossa? Did it originate in the cæcum? Might it not, if the patient be a female, be seated in the ovary, rare as are acute inflammations of that organ? One more example may be cited. A hard, unequal tumor, of irregular form, is distinguished through the abdominal parietes, near the umbilicus; it has supervened gradually, and its development has been accompanied by progressive loss of flesh in the patient, whose hue is of that straw color, which appertains to a particular class of organic diseases; no one can doubt the scirrhus nature of the tumor; but how great is the difficulty, in many cases, of determining its seat. Does it occupy the epiploon, or certain mesenteric glands, or the greater curvature of the stomach, or some part of the intestinal canal? All physicians know how embarrassing, in these circumstances, is the determination of its seat. In a large proportion of cases, the uncertainty in regard to the precise seat of the disease is less dangerous than doubt as to its nature; for the nature of the lesion, more generally than its special seat, constitutes the basis of therapeutical indications. The treatment of pneumonia, for example, differs generally but very little from that of acute pleurisy, but very much from that of pulmonary tubercle: in the former case, the two affections are identical in their nature, and different in their seat; in the latter, the seat is the same, but the nature of the lesion different.

2. At the same time that the physician endeavors to determine the kind of alteration presented by the affected part, it is equally important for him to know the *degree* attained by the disease. An inflammation which has hitherto occasioned simple turgescence of the diseased part, is quite unlike that which has already modified the tissues to a great extent; and this extensive modification is itself different from suppuration; scirrhus induration differs from ulcerated cancer, and tubercle exhibits quite as marked dissimilarity in the successive stages of its development. It is, then, highly important that the physician endeavor to appreciate this diagnostic point, the importance of which is acknowledged by all. In external inflammations, in cancerous affections of the skin, and in tubercle of the subcutaneous ganglia, the physician can easily determine the degree the disease has acquired; in internal diseases there frequently exist great difficulties. By the assistance, however, of the progress made, especially of late, by semeiology, a progress in which French medicine has had the largest share, the physician can appreciate during life, in a considerable number of visceral diseases, the different phases presented by the material alterations, and determine, more or less accurately, the degree they have attained. Enlightened by the signs supplied by the various modes of exploration of the chest, he is able to ascertain, in those cases where the disease is not limited to the deep seated portions of the lung, (and these cases are the most common,) whether the lung is affected with simple inflammatory engorgement, or whether it is indurated; whether the tubercles

developed in this organ are in a crude or softened state; he will sometimes appreciate, approximatively, the extent of cavities, and will easily recognise those cases where perforation of a tuberculous lung opens a communication between the bronchi and the cavity of the pleura.

In affections of the abdominal organs, but more particularly of those contained within the cranium, the determination of the degree attained by the disease is far more difficult; often it is wholly impossible. There are, however, some diseases in which the physician may judge with probability of the changes which supervene in the affected parts, from the duration of the disease and the intensity of the symptoms which reveal it. In typhoid fever, for instance, we can, generally, indicate at the different periods of the disease, the principal conditions of color, tumefaction, and ulceration presented by the intestinal follicles and mesenteric glands, without being able, however, to determine over what extent of the intestine and mesentery these lesions exist. In cerebral hæmorrhage, not sufficiently severe to cause death, it is not impossible for the physician to judge nearly of the changes which take place in the cerebral mass around the effused blood, and of its definitive absorption, by the time which has elapsed, and from the re-establishment of the locomotive function in those parts which had been deprived of it. But in the greater number of diseases which are seated in the abdomen and cranium, and especially in organic disease, we cannot determine the existing degree of lesion, the favorable or unfavorable changes which supervene in the intensity of the symptoms being equally dependent upon the modifications presented by the disease, either as regards its *extent*, or on account of its intensity.

C. *Symptomatic Phenomena considered in relation to Diagnosis.* — We cannot doubt the necessity of admitting local and general functional disorder, as elements of diagnosis. This necessity is very evident in those diseases where the physician cannot distinguish during life, nor ascertain after death, the anatomical lesion which might account for the symptoms; here the disease reveals itself only by functional disturbance; it is in the latter, alone, that the physician can find the elements of diagnosis. But in those cases, even, where anatomical lesion exists, the symptomatic phenomena are still of great importance in the appreciation of the disease. Compare pneumonia, occurring in a young and robust subject, and accompanied by that form of febrile action, known by the name of inflammatory fever, with the pneumonia which attacks an infirm and worn-out old man, which appears with adynamic symptoms, and we have, necessarily, two very different diseases, although the anatomical lesion may be nearly the same. Compare acute with chronic inflammation of the stomach; there are, in many cases, in an anatomical point of view, but very slight, and oftentimes even uncertain differences, while, by their symptoms, they constitute two entirely distinct diseases.

If, then, in diagnosis, we did not bear in mind the acute or chronic form of a disease, its character, or, as was formerly said, the inflammatory or adynamic nature which it assumes, we should form an inaccurate idea of it, and our diagnosis would be very incomplete.

The absence or presence of febrile action are conditions of some value in the diagnosis of many diseases. The complete *absence* of *fever* is an important sign in lead colic, and in many nervous affections, as also, in other cases, the *presence of fever* becomes an important diagnostic sign, in pneumonia, for example, and in typhoid fever.

Independently of the semeiological value of fever, in determining the seat and nature of the lesion, its existence, is, moreover, of great importance in any single affection, as a test of its intensity. Acute bronchitis, for instance, is of slight importance when entirely apyretic; it becomes more serious, if every evening there be accelerated pulse and elevated temperature; it may finally disturb the economy almost as much as pneumonia, when it is associated, as is not rare, with very intense febrile movement. In this latter case, if the patient be advanced in years, it becomes a very dangerous disease. The febrile state is, then, an indispensable condition in the appreciation of certain diseases, and should form one of the elements of diagnosis.

The *period* at which the disease has arrived, is likewise an indispensable condition in forming a medical opinion. In each phase of the disease, the anatomical lesion and functional disorders are modified daily, and he would be unworthy the name of physician, who, in his appreciation of a disease, should disregard the time already elapsed, and for whom pneumonia, at the stage of resolution, would not be different from the same disease at its stage of increase: the increase of the symptoms during the first days, is constant and regular; but when after the sixth, and much more after the eight or ninth day, the symptoms continue to become aggravated, the character of the disease is entirely changed, and the opinion formed upon the actual and future state of things, is far more serious.

Finally, the *type* of the disease becomes, in certain circumstances, not only an important, but the principal element of diagnosis. When a certain affection, inflammatory, hæmorrhagic or nervous, instead of appearing with a *continued type*, which is, as it were, the natural type for most of these affections, assumes one regularly intermittent, as the quotidian, tertian or quartan; when its characteristic phenomena appear and disappear alternately, as would be the case in regular intermittent fever, with that form of paroxysm, whose continuance is generally restricted to the limits peculiar to febrile paroxysms, the disease then becomes quite a different thing from inflammation, hæmorrhage, or nervous disease; it differs from them by its nature even, for it has a different cause, progress and treatment, and it was not without reason that those who preceded us, when describing these affections under the ingenious and expressive

name of *masked fevers*,* compared them with, and at the same time distinguished them from, normal intermittent fevers. In such a case, as will be evident, the type becomes in reality the most important diagnostic condition.

§ V. *Circumstances which may render Diagnosis difficult and even uncertain.* — In the preceding sections we have spoken of diagnostic signs, modes of exploration, the proper manner of examining patients, and the principal elements of diagnosis. It remains for us to glance at those circumstances which render diagnosis difficult and uncertain, and to indicate, summarily, the course which should be pursued in order to surmount these obstacles, and, according to circumstances, pronounce or delay our opinion. — These obstacles relate principally to the epoch at which the physician is called to the patient, to the predominance of general or sympathetic, over local phenomena, to the absence, even, of the latter, to the infrequency of the disease observed, to the complications, and to deception on the part of the patient.

1. *Difficult Diagnosis on account of the Period at which the Physician is summoned.* — When the physician is called at the commencement of an acute disease, it is often difficult, sometimes impossible, for him to know what it will be. The invasion of certain thoracic inflammations, is marked by phenomena of which the stomach and brain are the seat, as vomiting and delirium, and sometimes the first disturbance of the respiratory functions does not commence until the second or third day. The physician is doubtless excusable in these cases, when he fails to distinguish pneumonia which is not manifested by any symptom peculiar to that affection. Even in these circumstances, when the disease has commenced with that intense chill which belongs to pneumonia more particularly than to most other inflammations, if the invasion be sudden and spontaneous, without previous change of residence, or powerful moral impression; if both the country and season be remarkable for the frequent occurrence of pneumonia, the physician should be on his guard against the previously mentioned gastric and cerebral disorders, and while he delays giving a decided opinion, should suspect and even announce the possibility of commencing pneu-

* The diseases spoken of as "masked fevers" (*fièvres larvées*) are, properly, irregular intermittents, styled by Dr. Copland "simulating intermittents." (Med. Dict. art. Int. Fever.) He states their assumption of very diversified forms; or rather, that various affections, and chiefly those of the nervous system, may assume an intermittent form. The rheumatic and neuralgic forms are the most common. The type of "masked ague" is generally quotidian, double tertian or tertian; sometimes quartan, or double quartan. The disease is most common in spring and autumn, especially the former, and during the prevalence of easterly winds; it is usually attended by more or less disorder of the digestive, biliary and excretory organs, and its successful treatment depends mainly upon attention to this circumstance. — (Op. Cit. p. 1088. Am. Ed.) "The intermittents that occur in the United States, are chiefly of the simple form, although in some districts they often assume one or more of the complications above pointed out, when they are called *congestive* or *pernicious*." (Dr. Lee. Loc. Cit.). — TRANS.

monia. But in this, as in other cases, we cannot give a definite diagnosis, except at the period when the local and characteristic signs of the disease are distinctly manifested, and this is not, in most instances, until the second or third day, and sometimes still later. In typhoid fever, we can rarely form a positive diagnosis until the last half of the first week. In chronic diseases, whose invasion is gradual, several weeks, sometimes many months, elapse, before we can determine their nature, seat, and other essential conditions.

In all cases, the physician should be on his guard against the desire he may have of forming an opinion upon the sort of disease which is about to commence, and also against the very natural impatience of the patient's friends. The danger attending a premature diagnosis cannot be too strongly insisted on; not only does it expose us to error, but, moreover, we are placed in such a condition, that either through confidence in our first opinion, or fear of appearing undecided, we find it difficult to forsake the wrong path upon which we have entered.

It is not alone when summoned at the commencement of an acute or chronic disease, and prior to the development of those phenomena which characterize it at a later period, that the physician meets with difficulties and finds himself obliged to delay giving an opinion. In the opposite cases, that is, in those where an acute or chronic disease is about to terminate, either favorably or unfavorably, the diagnosis is often very difficult. The transition from disease to convalescence is similar in a great number of cases, and the features of the last struggle are uniform in both acute and chronic affections. It should be remembered that diagnosis is of far less value when the disease approaches its termination. There are cases, however, in which it is useful to know what the disease is which has proved fatal to the patient: not to mention facts appertaining to legal medicine, it is interesting to know, when the father of a family dies, whether the disease which proved fatal to him be capable of hereditary transmission; and if, contrary to custom, the physician was not summoned until the latter hours of the patient's life, and the information he acquires, together with the examination of the actual symptoms, be insufficient to decide his opinion, the extreme weakness of the patient forbidding the methodical examination of the different organs, examination after death can alone furnish the desired solution. When a disease terminates favorably, its exact diagnosis is generally of but little consequence. There are, however, exceptions; thus, when a patient is near the termination of an eruptive fever, it is of some importance to know whether it has been scarlatina or rubeola; not only because the first requires more strict and prolonged precautions during convalescence, on account of the anasarca which may supervene, but also because in after life, the individual who knows with which of these diseases he has been affected, will avoid the double inconvenience of either taking superfluous prophylactic precautions, or of neglecting those which are necessary.

The manner in which desquamation takes place, furnishes, in this case, an unequivocal diagnostic sign: it comes on more quickly, and the scales are small after rubeola; it is slower after scarlatina, the epidermis is smooth and shining, the fingers look as though covered with dried serous membrane [*peau de baudruche*, q. v.] the epidermis comes off in long strips, and sometimes even in the form of *gloves*.

When a disease, not yet in its last stage, has already gone through the greater part of its course, the diagnosis may also present certain difficulties to the physician who is then called for the first time, and for the reason that he has not witnessed the primary evolution of the antecedent phenomena. From this arises the indispensable necessity of ascertaining as accurately as possible, from the patient and those about him, and especially from the physician previously in attendance, the series of phenomena successively observed, from the invasion of the disease to the time of examination. Failure to obtain a part of this information might sometimes render it impossible for the physician to give a precise opinion in regard to the case in question.

2. *Difficult Diagnosis arising from the Predominance of the general or sympathetic Phenomena, or from the obscurity or absence of local Phenomena.* — When an important organ is the seat of serious lesion, sympathetic phenomena are manifested by the others, and particularly by the heart and brain, which, of all the viscera, are those most actively associated with the others when diseased; the digestive and respiratory organs are by no means strangers to these sympathetic influences. In many cases, and in acute inflammations particularly, this sympathy extends, simultaneously, but in different degrees, to all the functions of the economy, as is observed in the various forms of *febrile action*, to which an entire article will be devoted.

When the general and sympathetic phenomena are only of medium intensity, they do not mask the local symptoms, and their presence constitutes no obstacle to diagnosis, but it is otherwise in those cases where they become predominant; they then demand, and sometimes even absorb, the observer's attention, who, if he be not aware of the errors to which this unusual intensity of sympathetic phenomena may give rise, would be exposed to frequent deception in his diagnosis. This point seems to us so important, that we think it requisite, in this place, to glance at the principal sympathetic phenomena, and point out their value.

It should be noticed, in the first place, that the two organs which are the most common seat of sympathetic phenomena, are far less frequently the actual seat of disease, than the other important viscera. Thus the functional disorders of the brain and heart, as cephalalgia, delirium and even convulsions, accelerated circulation, palpitations and syncope, in the great majority of cases, especially in acute affections, have their source in other organs; while the serious disorders supervening in the digestive and respiratory organs belong, most frequently, to certain diseases of these organs

themselves, or of the parts which assist them in the performance of the same functions. When therefore we visit a patient with delirium, convulsions, or severe headache, we are induced to seek for its cause in the remoter organs rather than in the brain; as also we look for the source of severe fever in almost any other organ than the heart.

Cephalalgia may depend upon local sanguineous plethora, inflammation of the organs contained within the cranium, tumors developed in the same parts, or softening of the cerebral pulp, all which diseases, if we except the first, are rare in comparison with those which, being seated elsewhere than in the brain, produce sympathetic cephalalgia. Among the latter we shall cite only the different kinds of dyspepsia, so frequently productive of those attacks of frontal pain, improperly called hemicrania; acute bronchitis, in which the cough rings so painfully through the head that it seems ready to burst; prolonged constipation, typhoid fever, eruptive fevers during their first period, the paroxysms of intermittent fever, and almost all the visceral inflammations, which, in some patients, may be accompanied by more or less intense cephalalgia.* What has been said of cephalalgia is equally applicable to delirium, which will occur twenty times perhaps as a sympathetic, where it does once as an idiopathic phenomenon, that is, one dependent upon disease of the brain itself, at least in acute affections. This opinion we formerly communicated to Dr. Esquirol, and asked of him, as the most competent judge in such cases, if the observations that he had been enabled to make upon the delirium of the insane, had led him to similar or different results. He replied that he was convinced that in the insane, as well as in those affected with acute disease, delirium is most frequently sympathetic, and consequently subordinate to disease of some other organ than the brain. Cephalalgia and delirium have no very precise value in the diagnosis of cerebral affections, except when rigidity or paralysis of one part of the body, debility or loss of general sensibility, either of one or several senses, are added to one or both of these two symptoms.

What has been said of delirium, is equally applicable to convulsions and the coma which succeeds them; those observed in children in the first period of eruptive fevers, and during dentition, those occurring in puerperal women, those noticed in hysteria, in certain forms of malignant fever, or in persons under the influence

* Some instructive remarks upon the different forms and causes of cephalalgia, are quoted from Dr. Wright's *Clinical Lectures*, (published in the *Med Times*, Dec. 19, 1846,) by Dr. Ranking in his *Half Yearly Abstract of the Medical Sciences*, (January to July 1847, p. 33, art. 8.) The principal varieties mentioned, are those arising from the habit of masturbation, from dyspepsia, rheumatism of the cranial integuments, (an affection requiring great attention, as metastasis to the meninges may occur,) syphilitic taint and derangements of the menstrual function. The various causes which give rise to headache show the correctness of our author's rule of practice, viz. "to seek for its cause in remote organs, before referring it to the brain;" (p. 324). Several of the causes of sympathetic headache, enumerated by Dr. Wright, are not noticed by Chomel. — *TRANS.*

of certain poisons, are independent of any cerebral disease, properly so called.

Paralysis of motion and sensation is, of all cerebral disorders, the most valuable in the diagnosis of affections of the brain or its appendages; hemiplegia is a sign almost pathognomonic of some lesion of the opposite cerebral hemisphere; paraplegia generally reveals the existence of disease of the spinal marrow. There are, however, sufficiently numerous examples of paralysis of the lower limbs, in which, on post-mortem examination, no lesion whatever has been discovered; there are even certain cases of hemiplegia, in which the brain, examined with the most scrupulous attention, has exhibited no material lesion. We have also seen certain individuals in whom intestinal disorder has for some hours been accompanied by torpor of the entire lateral half of the body, which disappeared completely under the influence of abundant alvine evacuations, natural or artificial. But paralysis is no less the most certain sign of material lesion of the nervous centres, especially when it is permanent, and very pronounced, and occupies either the lateral half, or the lower portions of the body.

Disturbance of the cardiac functions, especially in acute diseases, but also in many of a chronic nature, appertains, in the great majority of cases, to the sympathetic phenomena. When the physician discovers in the patient to whom he is called, an intense febrile action, the idea that acute inflammation of the heart is the cause of the acceleration of the pulse would be the last which would occur to his mind. Syncope itself belongs much more frequently to certain forms of abdominal pain, to the indisposition which precedes vomiting and alvine evacuations, to certain moral affections, to some varieties of intermittent fever, or to the invasion of certain acute diseases, than to diseases of the heart and its envelopes. Irregularity in the pulsations of the heart, which seems to belong more particularly to material lesion of this organ, and which, in reality, constitutes one of its most important signs when permanent, (when, for example, they persist for one or more weeks, and more particularly when they last for many months,) is sometimes transient, like the sympathetic phenomena, in the same conditions which cause syncope; and in certain cases, even for a considerable time, when the same causes are in continual action, as in the case reported by Morgagni, and previously cited. (p. 175.) Excessive sanguineous evacuations effect changes in the force, frequency, and rhythm of the pulse, and even in the sounds perceived by auscultation (p. 167), which might simulate the existence of cardiac lesions, if the signs furnished by percussion and the examination of the different circumstances of the disease did not aid us in the diagnosis.

Hæmorrhage and dropsy belong to the secondary phenomena furnished by disorder of the circulatory organs. Both appear, in certain circumstances, with great intensity; they predominate so much over the other symptoms, which are frequently very obscure, that they seem to constitute the entire disease, and in many

instances it is really very difficult, sometimes even impossible, for a considerable period, to determine accurately whether the hæmorrhage or the dropsy we observe, be essential or symptomatic.

Hæmorrhage occurring during the course of diseases * is, as we have elsewhere seen, general or partial (p. 201). The former is of easy diagnosis; it furnishes an additional sign in scorbutus and pestilential diseases, and renders the disease more manifest. It is chiefly when hæmorrhage takes place from a single organ, that the diagnosis is obscure. Two conditions here present themselves; in the first, the organ which is the seat of the hæmorrhage has previously shown indubitable signs of being in a morbid condition, and in that case, the occurrence of hæmorrhage assists, rather than hinders, diagnosis. This is observed in individuals, who, with equivocal signs of pulmonary tubercle, cancer of the stomach, or typhoid fever, suddenly discharge blood, either from the bronchia, the stomach, nares or intestines: in these cases, the hæmorrhage evidently confirms the diagnosis. In the second condition, the hæmorrhage appears in those apparently in health, manifesting itself as a primary and unique phenomenon; the patient and those habitually with him, assert that no functional alteration, nor change in his usual appearance preceded the hæmorrhage, and the examination of the cavity whence the blood is discharged, although often repeated, and by all the known modes of exploration, reveals no lesion. In such a case the physician remains in great doubt; the extreme rarity of essential hæmorrhage should lead him to fear that that which he observes is symptomatic, still the absence of the peculiar characteristic signs of material lesion does not allow him to affirm its existence; he must, then, defer giving his opinion until new signs come to his assistance. Recovery after profuse hæmorrhage is often very uncertain, and we cannot be entirely confident of it for many months or even years. This is particularly applicable to hæmoptysis, which is often indicative of latent tubercle, and to hæmatemesis and hæmaturia, which are sometimes the first signs of lesion in the stomach or urinary organs. Uterine hæmorrhage is generally more easily distinguished, because the exploration of the uterus is far more direct and complete than that of the lungs, stomach, and kidneys can be: but, on the other hand, those affections to which this kind of hæmorrhage appertains, are more varied and their distinction frequently obscure. Although the uterus is the seat, during several years of life, of a normal sanguineous discharge, and essential hæmorrhage is more rare from this organ, than from the others which have just been named, considerable uterine hæmorrhage is, notwithstanding, in a great majority of cases, a symptomatic phenomenon, and whenever the

* Hæmorrhage belongs, at one time, to general phenomena, at another, to the local symptoms of diseases: the first alone should have here been considered, but we thought it useful to add a few words upon the latter, in their relation to diagnosis; an entire article seemed unnecessary.

physician meets with a case of this nature, either in the old or young, married or single, his first reflection should be that the existing hæmorrhage arises from disturbed pregnancy, threatened abortion, the presence of some foreign body in the uterus, a cancerous affection, granular inflammation or some other less frequent disease of this organ.

We cannot conclude this article, devoted to the semeiological value of hæmorrhage, without reminding the reader, that that succeeding the suppression of the menstrual, or of some other constitutional or periodical sanguineous discharge, has the least importance in regard to prognosis, and is most frequently unconnected with *material lesion* of the parts where it is manifested.

Finally, it should be remembered that the suspension of constitutional hæmorrhage, particularly of the menses, unless occurring with the natural conditions, is almost always the effect of disease, either latent or manifest, developed sometimes in the uterus, but more frequently in a distant organ, as the stomach, and particularly the lungs, or even affecting the entire system.

We class dropsy among the disorders of the organs of circulation, because, in a very great majority of cases, it arises from an obstruction in the course of the blood, either in the heart, in which case dropsy progressively pervades the whole system, commencing at the extremities; or in *some point of the venous system*, the effusion being then confined to the parts from which the branches of the compressed or obliterated vein arise. *General dropsy*, which has supervened *gradually*, is one of the most certain signs of organic affection of the heart, or of a more or less serious change in the composition of the blood, or, finally, of that disease of the kidney described by Dr. Bright, of which the presence of albumen in the urine is the pathognomonic sign. *General dropsy*, manifesting itself *rapidly* in an *acute disease*, becomes a valuable sign in the frequently obscure diagnosis of pericarditis and endocarditis. In 1826, we pointed out the importance of this phenomenon in acute pericarditis,* and in the course of the same year, at the Clinique of the Hotel Dieu, this sign led us to suspect endocarditis in a young female, which proved fatal. Finally, when an individual is attacked with acute anasarca, we should always ascertain if he have not been recently affected with some eruptive disease: anasarca, indeed, is observed quite often in convalescents from scarlatina, the material cause of the effusion not being, as yet, accurately determined.

The diagnostic signs furnished by *partial dropsy*, are equally important. When confined to a single limb, it indicates compression or obliteration of its veins. The examination of the infiltrated limb, enables us sometimes to recognise in the course of the vein, near the trunk of the body, a very firm cylinder, formed by the inflamed and indurated vessel. But in the greater number of cases, this partial œdema of a limb results from compression made upon

* *Dict. de Médecine*, En 21 vol. Art. *Péricardite*.

the principal vein, by a tumor developed either in one of the iliac fossæ, or within the thorax, according as the infiltration occupies the thigh or the arm: in certain cases, this infiltration is the first and even the only sign which indicates the existence of the tumor or leads us to suspect it, and can alone enable us to form a correct diagnosis. When dropsy occupies the two lower limbs simultaneously, it may depend upon compression of the vena cava abdominalis; but most usually, this form of œdema is only the first degree of general dropsy, which begins at the most depending parts, where the difficulty with which the blood rises in opposition to the laws of gravity, concurs with the lesion of the heart, or the change in the blood, in the production of serous infiltration. It is otherwise in very rare cases, where dropsical effusion occupies the superior half of the body: we then cannot doubt the existence of a considerable obstacle to the circulation of the blood in the vena cava superior. A case of this nature occurred the present year at the Medical Clinique of the Hotel Dieu. A man was admitted, whose face, neck, upper half of the chest, and both arms, presented enormous serous distention which contrasted singularly with the excessive emaciation of the inferior three fourths of the body. The necropsy disclosed a cancerous tumor, developed in the mediastinum, by which the vena cava superior was, as it were, strangulated, confirming, at least as far as regarded the existence of a tumor, the diagnosis which had been made; nothing had indicated that this tumor was necessarily cancerous, and the relative frequency of aneurismal tumors of the aorta would more particularly have aroused suspicions of the latter cause of compression.

Among the partial dropsical effusions, we shall enumerate ascites, the most important diagnostic sign of cirrhosis of the liver;* also the serous infiltration which supervenes in prolonged intermittent fevers, and which is distinguished by the dull yellow tinge of the skin and congestion of the spleen, which, like the dropsy, are the consequence of these fevers. We would also mention the serous infiltration developed in the vicinity of certain deep-seated abscesses, and which is, in some cases, almost their only sign; and the serous infiltration of one half of the face, a phenomenon which alone, in certain cases, leads us to seek and discover an abscess formed near the alveolar border of one of the maxillæ, and arising almost always from a carious tooth.

3. The secondary or sympathetic phenomena furnished by the digestive and respiratory organs, are, as we have remarked, of far less importance, and rarely embarrass diagnosis. The anorexia

* In ascites dependent on lesion of the liver, the *urine* is always more or less deeply colored, whilst in renal ascites (Bright's disease or otherwise), it is white or colorless (Rayer). This characteristic condition of the urine was known to the Arabian physicians. — (*Monthly Journal of Med. Science*, Dec. 1847, quoted by Dr. Ranking, *Med. Abst. Jan. to July*, 1847.) Dr. Budd declares the urine in cirrhosis to be almost always scanty and *high colored*, depositing lithate of ammonia. (Diseases of the Liver. Cirrhosis.) This, being constant, will always assist in the differential diagnosis of ascites. — TRANS.

accompanying the greater number of diseases, and the acceleration of respiration in all cases where the circulation is quickened, hardly ever lead the physician to suppose the stomach or lungs the seat of a disease which might be situated in any other part of the body. The contrary is true of vomiting, cough, and dyspnœa.

Vomiting does not always depend upon disease of the stomach; its productive cause may be elsewhere seated. We have previously stated the numerous and various conditions which may cause vomiting, and lead to the supposition of an acute or chronic affection of the stomach. We shall, at present, only call to mind the difficulty presented by certain cases of misunderstood or simulated pregnancy, and of epiploic or intestinal hernia, so small, or so far concealed by obesity, that they are not discovered until they have been suspected, and after a most attentive search. The obstinate vomiting, which, in certain instances, is the predominant symptom in hepatic and nephritic colic, and which may mask the local symptoms, should also be mentioned. We would particularly mention those cases, as yet too little known by most physicians, of accidental occlusion of the intestine, of which vomiting is the most apparent sign; a disease confounded with the peritonitis consequent upon it, and in which energetic purgatives, assisted by the external and internal use of ice, often produce most wonderful effects.

Cough and dyspnœa are two phenomena sometimes determined sympathetically by an affection of remote organs, and may render diagnosis difficult or erroneous. We have previously mentioned the principal forms of sympathetic cough (p. 153), we need not re-enumerate them: we shall only remark that sympathetic cough is habitually dry, if we except that called gastric, which is often accompanied by a glairy exhalation from the posterior fauces. Sympathetic cough, also, is not accompanied with those auscultatory and percussory phenomena belonging to pulmonary diseases, and which manifest themselves almost constantly with idiopathic cough. Dyspnœa rarely occurs as a sympathetic phenomenon; it belongs almost exclusively to affections of the pulmonary or circulatory organs, which are intimately associated, or to material lesions of the nerves, which preside over respiration and circulation; in all these cases, it is idiopathic, or may be so considered. That form of dyspnœa observed in cases of enormous distention of the abdomen in ascites, tympanitis, and encysted dropsy, is entirely mechanical, and its source cannot escape the most unpractised eye.

Sympathetic dyspnœa is hardly ever observed, except under the influence of certain moral affections, whose effects extend, in some persons, to the entire nervous system, as in females affected with *so called* hysteria, while in others they are concentrated in the respiratory organs. Certain stomachal affections, characterized by an acute pain or a kind of spasm in the epigastric region, sometimes occasion dyspnœa so intense, that the patient apprehends suffocation. In all these cases, the cause of the dyspnœa,

the diagnostic signs and remedial indications, are to be sought elsewhere than in the respiratory organs or their appendages.

Having reviewed the sympathetic phenomena which may be presented by each of the four great functions, and pointed out the difficulties of diagnosis resulting from the intensity of these phenomena, we shall now examine febrile action, which comprises all functional disorder, when considered in regard to the obstacles it places in the way of the diagnosis of disease, on the one hand, when by its predominance it masks the local symptoms, or when these symptoms are entirely wanting; on the other, when it is so slight in itself as to remain almost unperceived: for we should not forget that if the violence of the fever be a frequent obstacle to diagnosis, its presence is sometimes one of its necessary elements.

Febrile action is observed with either the *intermittent* or *continued* type, and with an *acute* or *chronic* form. It is particularly in these two points of view that it should be examined, when the diagnosis is difficult. The degree of intensity and the inflammatory, adynamic or ataxic forms of fever have, in this connection, only a secondary interest.

Febrile action which manifests itself with the intermittent type, is generally considered as exclusively appertaining to essential intermittent fevers, and as requiring to be treated, in consequence of this opinion, by the specific remedy usually employed in these diseases. This opinion, which is mainly true in regard to those febrile affections whose paroxysms are widely separated, as in the quartan and even the tertian type, is no longer so, when we arrive at the quotidian, and more especially the double quotidian. Proportionally, indeed, to the proximity of the paroxysms, the number of cases in which the fever is symptomatic becomes greater, so that, by referring to the results of our own observation, which extends over a space of more than thirty years constantly passed in the hospitals, the double quotidian fever is always symptomatic; the quotidian is so in more than half the cases; the tertian rarely; the quartan never. We consider this result as more important, from the fact that many physicians, otherwise well informed, are not sufficiently aware of the frequency of symptomatic intermittent fevers, and how necessary it is to guard against the too general tendency to declare the existence of essential intermittent fevers wherever the intermittent type is perceived. Here, as we have seen, the duration of the intermission is highly important, since the farthest removed paroxysms belong constantly to essential intermittents, which are the nearest allied to the symptomatic fevers. It is, then, in the intermediate types that difficulties may occur in diagnosis; to these, consequently, our attention should be chiefly directed.

The tertian type, whose paroxysms occur generally at intervals of about thirty-six hours, does not, as we have said, belong, except very rarely and as if accidentally, to symptomatic fevers. We have had, in the clinical wards of the Hotel Dieu, an individual affected with gastro-enteritis of medium severity, with tertian febrile

paroxysms, evidently under the control of the regimen adopted by the patient. In fact, during the eight or ten days which preceded his admission, this man had alternately tried, on the one day, food whose ingestion was followed by a febrile paroxysm, and on the following day, abstinence; simple abstinence from food prevented the return of these paroxysms, which may be termed artificial, and the use of certain antiphlogistic remedies subdued the gastrointestinal inflammation in a short time. Evidently, in this case, the febrile paroxysms were the result of inflammation of the digestive passages, exasperated every two days by the unseasonable use of food. The repeated action of cold may produce effects in bronchitis, analogous to those determined by food in gastritis, and accidentally give to the disease the appearance of tertian intermittent fever; but these cases are very rare, and the tertian type must be regarded as appertaining to essential intermittent fevers.

It is otherwise with the quotidian type, as we have previously remarked; the greater number of diseases presenting this type, and perhaps all those of the double tertian, belong to symptomatic fevers. When, therefore, a disease manifests itself with the quotidian type, our whole attention, in examining the case, should be given to the determination of the essential or the symptomatic nature of the fever. In the solution of this question, which is so often presented in the practice of medicine, it is interesting to know the affections in which the symptomatic quotidian type has been particularly observed. There is, perhaps, no inflammation, acute or chronic, no suppuration, either manifest or concealed, which has not been accompanied during a certain part of its course, by quotidian paroxysms. But it is chiefly in inflammations of the bronchial, digestive, and urinary mucous membranes, in the second stage of tuberculous affections, and in cases of deep-seated or superficial ulceration, that this febrile type occurs. Thus, when we are observing a quotidian intermittent, we should endeavor to ascertain, by the examination of the patient, whether the paroxysms do not depend upon some one of these affections. In many cases the diagnosis is easy: on one hand, the primary disease manifests itself by signs peculiarly its own; on the other, the febrile paroxysms, instead of commencing in the morning or at mid-day, at precise hours, or at least with uniform intervals of twenty-two, or twenty-six hours, for instance, begin almost constantly towards evening, that is, at the time when the paroxysms of the phlegmasiæ, and of almost all diseases of continued type, occur. But there is not always this distinctness. In certain cases, the local symptoms of the inflammation, the abscess, or the tuberculous affection, are obscure, easily escaping the notice of the physician who does not search for them; sometimes even, they are not evident to the one who suspects them, and who employs all the known explorative means for their discovery; in certain cases, finally, the febrile paroxysms become so intense, that they might be considered as pertaining to the pernicious form of intermittent fever, and this disproportion between the general phenomena and the local lesion

renders the diagnosis very difficult, sometimes even impossible, until new signs come to our assistance. These paroxysms of a pernicious nature are especially observed in diseases of the urinary passages, and in ruptures of the canals and reservoirs of this fluid; and their origin is unknown until the moment when gangrenous inflammation of the tissues infiltrated with urine, reveals the cause of all the disorder. Generally, also, in these very rare cases, the febrile action assumes rather the *remittent* than the intermittent type: by carefully questioning the patient and the assistants, we sometimes succeed in learning that previously to the existing affection, there was some disorder in the urinary passages, that the first chills came on after violent efforts to pass urine, etc. But the following important fact, above all others, may enlighten the physician in the midst of the difficulties with which the severity of the paroxysms surrounds the diagnosis, viz. that in a healthy country (at Paris for instance), nothing is more rare than essential pernicious fever, therefore, unless it has been elsewhere contracted, we must suspect a symptomatic fever in the paroxysms which are observed of this pernicious nature, and, by an attentive and methodical exploration of all the organs and functions, endeavor to discover the source of those alarming symptoms, which are, in reality, but the shadow of the disease.

Lastly, it frequently happens that the paroxysms of certain acute affections, particularly those of typhoid fever, are distinguished, for several consecutive days, by chills, which may occur at the same hour, and give to the disease the appearance of the intermittent, or remittent type; but this is only the exceptional course, and after some days the disease resumes the *continued* type peculiar to itself. The same thing occurs, either in the first period of certain acute inflammations, in which every exacerbation of the disease may be marked, as was its invasion, by successive chills; or in an advanced stage of certain acute diseases, when metastatic abscess is formed. In these various conditions we observe the great importance of quotidian chills, in a diagnostic point of view.

Before concluding our remarks upon the diagnosis of intermittent affections, we would add, that, if in many cases the predominance of the febrile action masks the original disease, in some cases of essential intermittent fever, on the contrary, the paroxysms are so feebly marked, that they easily escape the superficial observer, who would see only, in the patient he attends, a want of power in the digestive organs, œdema of the lower limbs, and enlargement of the spleen. It is particularly in those places where essential intermittent fevers prevail, and in those individuals who have exhibited their manifest access, that the obscure paroxysms, we have thought it important to notice, are observed.

Continued febrile action may be either acute or chronic; in the latter form, it is called *hectic fever*; in the former, it is divided into ephemerai and synochal, according as it only attains or continues beyond the third day. These are not useless distinctions, when continued febrile action is considered in regard to diagnosis.

Ephemeral fever is often the symptom of slight inflammation, as coryza, or cynanche tonsillaris, whose symptoms are sometimes prolonged, with diminishing intensity, after the cessation of the febrile action. But often, likewise, ephemeral fever, particularly in children, is a primary or essential disease; in some individuals it results from certain causes which reproduce it whenever they are in action; unusual exercise, exposure to cold or heat, strong emotion, or errors in diet, are sometimes sufficient to determine a very intense febrile action accompanied by alarming symptoms, but ceasing after twenty-four or forty-eight hours, without any remedial aid.

When a disease commences with continued febrile action, it is generally difficult and often impossible to determine its duration, whether it will remain within or go beyond the limits of ephemeral fever. This uncertainty exists, indeed, at the commencement of many acute affections, whose diagnosis, as we have said, cannot be pronounced until the second or third day. Most frequently, it is not until after the cessation of ephemeral fever, that the diagnosis is entirely clear. The uncertainty is not of long duration, and not seriously injurious. But when the continued febrile action exceeds the period of ephemeral fever, and especially, when it continues beyond the fifth or the sixth day, and there are no manifest signs of a local affection, the diagnosis may be very difficult, and the uncertainty, a serious inconvenience. The principal affections with which it is connected are latent visceral inflammations, and eruptive affections of abnormal course, inflammation of the veins or lymphatics, and typhoid fever.

There are but few visceral inflammations sufficiently grave to produce febrile action persisting with considerable intensity until the fifth day, without its existence being revealed by local signs. There have been cases, however, where inflammation of the uterus and its appendages, or of some portion of the peritoneum or neighboring cellular tissue, especially after parturition, has occasioned febrile action, whose source it is difficult to determine, although the patient's peculiar state calls attention particularly to the affected point. An attentive exploration of the uterus and pelvic cavity, by vaginal and rectal examination, and by palpation of the abdomen, does not always enable us to establish an immediate diagnosis, and in some cases many weeks elapse before the characteristic signs begin to appear. With the exception of these particular cases, the chest is the most frequent seat of those latent inflammations, which febrile action leads us to suspect, although not declared by any local symptom. Not to mention certain cases of pericarditis without effusion, of interlobular pleurisy, or that confined to the diaphragmatic and mediastinal regions, where auscultation and percussion would be almost unavailable, we would particularly notice that *deep-seated pneumonia*, equally inaccessible to our means of exploration, and which, sometimes occurring without pain in the side or sputa, almost defies discovery. In these obscure cases, however, the intensity of the invading chill, whose

value we have already mentioned, the persistence of febrile action for a longer period than four or five days, particularly in a patient beyond the age exposed to typhoidal affections, and in a season when pneumonia is prevalent, should suffice, not wholly to convince the physician, but to lead him to a confident presumption, that the febrile action observed arises from pneumonia.

In the eruptive affections, the febrile action usually precedes the exanthema by a few days only; it is, then, in entirely exceptional cases, that the fever of invasion persists until the fourth or fifth day, before the appearance of the eruption; and it is even more unusual that the contagious principle of variola, rubeola, or scarlatina, causes a febrile action, which is not followed by an eruption, (*variola sine variolis, morbilli sine morbillis, scarlatina sine scarlatiná.*) In cases where the fever persists, and no eruption appears, the diagnosis may be elucidated to a certain extent, by considering the prevailing diseases, by the symptoms peculiar to the period of invasion of each of the eruptive fevers, as the coryza, epiphora and cough in rubeola, the sore throat in scarlatina, and the lumbar pain in variola; and in each of them by the appearance of an eruption upon the mucous membrane of the mouth, similar to that which should have been manifested upon the skin, and, finally, by the inaptitude to contract the same disease in future.

Inflammation of the veins or lymphatics causes intense and permanent febrile action, whose source is sometimes very obscure. A slight wound, the contact of putrified matter with a simple excoriation, sometimes a mere contusion upon the surface of the body in a part where the veins rest upon a bone, as the cranium and the front of the tibia, have been the occasion of latent phlebitis, the sole symptom of which has been intense fever for a period of from eight to ten days, until the appearance of multiple abscess beneath the skin established the diagnosis. In these difficult cases, the necessity of tracing the febrile action to its cause, should lead the physician to put his questions with a view to all those circumstances likely to induce phlebitis; and when this inquest has given the proper direction to our search, the attentive examination of the region where the disease commenced sometimes reveals modifications in the consistence, volume, and sensibility of its vessels, which, although slight, become very valuable diagnostic signs.

But of all the affections where continued and prolonged febrile action is observed, without local phenomena clearly indicative of its source, typhoid fever is indisputably the most common. The greater part of those affections described by writers of former ages under the name of essential fevers are, evidently, as we have proved,* only various forms of typhoidal disease, since post-mortem examination reveals identical lesions in all these fevers, which are not met with in any other disease. From this fact it follows, that typhoid fever is one of the most frequent affections noticed in

* Leçons de Clinique Médicale sur la Maladie Typhoïde.

our climate, and if we consider that the general symptoms which accompany it are often very grave, while the local phenomena connected with the anatomical changes are most frequently obscure, and sometimes almost null, we shall, by a comparison of these two conditions, have the natural explanation of the opinion often expressed in our clinical instructions, viz. that an acute fever persisting beyond the eighth day, and presenting, up to that period, after methodical and repeated explorations, no indication of local inflammation sufficiently intense to explain the fever, should be considered typhoidal, at least in our climate, and in our usual sanitary condition.* Certain rare exceptions to this practical axiom do not invalidate it.

Hectic fever, or the chronic form of continued febrile action, is also of great importance in the diagnosis of disease, whether, as is quite often the case, the hectic fever being apparent, the lesion which produces it remains concealed; or whether this affection is itself obscure and uncertain in its manifestation. If we except the very rare cases where it is the direct result, either of a profound moral affection, of excesses or of considerable evacuations, hectic fever is almost always the effect, and consequently, the sign, of chronic suppuration, itself arising from essential or symptomatic inflammation; caries of the bones, for instance, or the tuberculous affection. In a considerable number of cases, it is difficult to determine to which of these lesions the hectic fever should be ascribed: certain forms of chronic abscess are unaccompanied by any local sign whatever; some chronic inflammations, likewise, occasion only a progressive and apparently inexplicable marasmus, and the tuberculous affection, the most frequent of all the diseases productive of hectic fever, is at the same time one of those whose local symptoms may longest remain obscure. Thus the existence of hectic fever, without local lesion to explain it, is a sign almost pathognomonic of tubercular disease, as an acute fever, whose source is not evident after seven or eight days' continuance, is almost characteristic of typhoidal affection.

Before approaching another subject, we would add that in the continued, as well as in the intermittent, type, the difficulties of diagnosis do not always depend upon the predominance of the febrile action and the obscurity of the local symptoms. In certain cases, on the contrary, the local symptoms are sufficiently well marked, but the slight intensity of the febrile action might lead us to suppose that it was entirely absent, and thus communicate an uncertainty to the diagnosis of certain affections where the *febrile condition* is an important sign. Thus, individuals are met with, aged persons particularly, in whom the examination of the chest and the character of the sputa announce the existence of pneumonia; but the state of the pulse, the slight heat of the skin, especially

* That is to say, abstraction being made of the times and places in which epidemic or pestilential diseases are prevalent; such as contagious typhus, the plague, yellow fever, certain kinds of puerperal fever, etc.

if we examine the patient in the morning, seem to indicate an apyretic state which little harmonizes with such an affection. In such cases, by ascertaining the state of the healthy pulse in these individuals, by examining the degree of heat elsewhere than at the wrist, upon parts constantly covered by the bedclothes, as the chest or abdomen, by observation of the patient at different parts of the day, we are enabled to ascertain the existence of a febrile action, which becomes manifest in its exacerbations and is discoverable even in its remissions. The same is true of that scarcely noticeable febrile action which accompanies typhoid fever during the first week, and sometimes even through its entire course, when it assumes its mildest form.

The phenomena of hectic fever, in certain cases, (and almost always at its commencement,) are for a considerable time obscure and of difficult appreciation. It does not cause that disorder in the system which belongs to acute febrile action. The latter instantly produces general indisposition, loss of appetite, and confines the patient to bed; while hectic fever, especially during its first period, does not at all affect the habits of life; the strength and flesh, it is true, diminish gradually, but most frequently the patient pursues his occupations, eats and digests nearly as usual; sometimes even, he does not perceive the slightest change in his health. This is particularly observed in the course of certain diseases of the chest, when the pulse begins to be accelerated, the thirst to increase, and the sleep to be accompanied by morning perspirations. In these cases, the knowledge of the existence of commencing hectic fever, is frequently the most important point in establishing the diagnosis of a tuberculous affection.*

3. *Difficult Diagnosis resulting from the Infrequency of the Disease.* — If those diseases be excepted which are seated upon the external surface, or in parts which, although situated somewhat profoundly, may yet be directly examined by the aid of our explorative means; we repeat, if these diseases, whose diagnosis is

* Although hectic fever is connected with tuberculous affections in so great a majority of cases, that its mention, alone, suffices most frequently to bring to mind its formidable companion, (or, more properly speaking, its *cause*, considering hectic fever as a symptom or assemblage of symptoms;) yet it should be remembered that many other affections or practices induce a species of hectic fever. Authors have enumerated several varieties; as *Gastric, Pectoral, Genital, Hemorrhagic, Cutaneous, Moral*, etc. (Broussais): *Inflammatory, Putrid, Nervous, Gastric, Atrabilious, Pituitous, Verminous, Entero-mesenteric, and Suppurative*. (Hildenbrand.) To these, *puerperal* hectic is added by Dr. Copland. — (Med. Dict. Hectic Fever.) Of these various forms, the *genital, hemorrhagic* and *moral* seem most constantly inclined to merge, finally, in the *pectoral*, which deservedly occupies the first rank in point of frequency. The other varieties, depending upon special and evident causes, disappear with *their* removal, and rarely terminate in the pectoral, which may, (if we may hazard the opinion,) be considered the *only incurable* variety, depending as it does, nearly always, upon causes incapable of removal. The *suppurative* form may be considered as next in point of fatality, but cannot compare with the *pectoral*. The gastric disorder accompanying pectoral hectic can hardly be considered as indicating the termination of the gastric in the pectoral variety. — TRANS.

generally quite easy, because they are evident to our senses, be set aside, we must admit that, generally, the more rare a disease is, the less it is understood, and consequently its diagnosis is more obscure. This proposition needs no proof. The most highly educated physician, when confronting a disease he has never observed or heard described, and of which, perhaps, there exists no example in the annals of the science, will often experience insurmountable difficulties in its diagnosis. Such was the position of Boerhaave when called to visit Admiral Wassenar, laboring under the dreadful symptoms of transverse rupture of the œsophagus. Post-mortem examination alone revealed the material lesion productive of symptoms equally frightful and unusual.

It is not only in cases where the signs of a disease and its very existence are unknown, that diagnosis is difficult or impossible; these difficulties, this almost impossibility, exist in certain very rare affections, whose anatomical nature and symptoms, however, are recognised when they have signs in common with another disease daily observed by the physician. In fact, when a group of symptoms belongs to two affections, one of which is very frequent, and the other as rare, the physician will, and naturally should, be led to apply these symptoms, whenever presented, to the most common disease. If, for example, in a case of chronic disease, one side of the thorax present, in a limited space, (which is constantly the same whatever be the attitude of the patient,) a flat sound and entire absence of the respiratory murmur, without fever, and with medium loss of flesh, we may suspect two different lesions: either there is pleuritic effusion circumscribed by adhesions, which is of daily occurrence, or a solid tumor developed in the pleura or in the pulmonary parenchyma, some examples of which are contained in the records of the science. The latter does not, perhaps, occur in greater proportion to the former, than one to one hundred thousand; therefore when the exceptional case presents itself, it will almost inevitably become the source of error in diagnosis, especially if the physician have not been summoned at the commencement of the disease, or if the exploration of the chest was not scientifically made. The unequal frequency of diseases necessarily constitutes one of the elements of diagnosis; it sometimes renders it more obscure, but in most cases it is highly serviceable to the physician, when the *inductions* furnished by it are employed with proper reserve.

4. *Complications* generally *embarrass diagnosis*, either because the symptoms of one disease encumber or obscure those of the other, or because the mingling of these phenomena changes simultaneously the physiognomy of both affections, so that neither of them exhibits its usual characteristics. There is rarely error in regard to both diseases at once; but it often happens that one of them is misunderstood, and that the phenomena appertaining to the other disease are referred to sympathetic disturbance of the functions. This error may usually be avoided, by recollecting, that in order to form an accurate diagnosis, we must not only ascertain the actual

disease, but also be sure that no other exists. By such a method of examining patients, obscure complications will frequently be detected, and sometimes even, we may be led to perceive in that at first regarded as the unique and essential disease but a symptom or consecutive lesion of one subsequently distinguished.

5. There is still another condition which greatly *enhances the difficulties of diagnosis*: this is *deception* on the part of individuals who wish either to conceal the diseases under which they labor (*maladies dissimulées*), or to induce the physician to suppose others, really non-existent (*maladies simulées*).

It is quite common for individuals to seek to conceal from the physician the diseases which affect them: a false modesty, fear of blame, or a wish to retain or obtain employment, are the most usual causes of such dissimulation. But it far more frequently happens that individuals complain of diseases which they have not, for the purpose of obtaining something desired, or avoiding something apprehended. The talented author of *Guzman d'Alfarache* has exposed the greater part of the tricks practised by mendicants to excite the public commiseration. The wish to avoid military service often leads young men to feign various diseases. Many persons indicted for criminal offences have feigned derangement in order to escape impending condemnation.

Some of these simulated diseases may take place without the slightest disturbance of the health; an individual in perfect health may feign paroxysms of intermittent fever with general tremor and chattering of the teeth, rheumatic or nervous pains, loss of one of the senses, as hearing or sight, apoplexy, epilepsy, hysteria, mania and incontinence of urine. There are other affections which cannot be simulated except by determining a disease resembling them, but which is very slight: such is the kind of fever produced by the internal use of excitants, by the introduction of garlic or tobacco into the rectum, etc: cutaneous diseases are simulated by the application of rubefacients, elephantiasis by insufflation of air into the cellular tissue, cancer of the mammæ by the use of certain topical irritants, etc.

It is very difficult to ascertain a concealed disease, except it determine a remarkable change in the external appearance, or that the friends of the patient oblige him to consult a physician. If the disease present external signs, the successive examination of the various parts may lead to its detection. If those signs be wanting, if, for instance, concealed grief be the cause of settled decline, the diagnosis is very difficult so long as the patient obstinately refuses to reveal his ailment.

The sagacity of physicians, however, has on many occasions surmounted these obstacles. We even now admire the penetration of *Erasistratus* in discovering the secret cause of the illness of *Antiochus*, and the address with which he succeeded, contrary to all expectations, in restoring him to health, by obtaining for him the hand of *Stratonice*.

The distinction is usually more easy in simulated diseases. The

peculiar situation of the individuals, the knowledge of those things which they necessarily fear or desire, and their relations to those around them, often communicate the first suspicion to the physician, and, most frequently, when he is deceived, it is because the fraud has not been suspected. In some cases, however, the difficulty is very great, especially when he who wishes to deceive perfectly understands the part he is to play, and has great interest in sustaining it. *Mahon* has related a very striking example of this sort.* A young soldier, with the intention of quitting the service, feigned total loss of vision. The fraud was suspected; he was consequently subjected to the most painful treatment, while every means were put in requisition to expose the deception. Various attempts having proved useless, the following was tried as the last resort. He was stationed at a few paces distance from a deep river and ordered to walk straight forward; this he did without hesitation and allowed himself to fall into the river. After this trial, he was still retained, with a promise of release on confessing the truth; he refused for a long time, but finally, convinced of the sincerity of those who promised, he took up a book and read.

The means employed for distinguishing simulated diseases vary according to circumstances. The very attentive examination of all the phenomena usually leads to the detection of the fraud; most simulated diseases, indeed, have but an imperfect resemblance to the real affections; there is always something unusual which does not escape the practised eye. Feigned diseases very closely resemble flowers and fruit attached to trees which do not produce them: ordinary observers may be deceived, but the expert botanist is not the dupe of such an artifice.

An individual who endeavors to feign a disease, rarely foresees all the questions that may be addressed to him upon the course and succession of the phenomena which he has experienced; taken unawares on many points, he hesitates in his first replies; if interrogated a second time in regard to the same things, his memory fails him, especially when the questions have been numerous; if he do not betray himself in his answers, he can, in most cases, be led to say things in regard to the progress of his complaints, which are in such complete opposition to daily observation, that they expose the deceit in the surest manner.

If all this should prove insufficient, the individual suspected of feigning disease might be submitted, for one or more days, to rigid diet. This plan, which is wonderfully efficacious with children, is likewise of great service in hospitals, especially where active supervision prevents the individuals submitted to such a kind of proof from procuring food, which is far more difficult than is generally supposed. We might, however, announce to the patients that it will be requisite, *if the disease persist*, to resort, without delay, to painful measures, as blisters, setons, and moxas: the inconveniences of these means might be exaggerated, and we might

* MAHON, *Médecine-légale*, tom. i.

even proceed to apply them, because they are indicated if the disease really exist, and because, if the disease be feigned, the patient will not submit to their use, especially if it be necessary to repeat them. Finally, one means, nearly always successful with females who simulate hysterical attacks, is the prescription of a large blister over parts which are habitually uncovered, as the nape of the neck, or even the throat and chest: the pandiculation and yawning which usually terminate the attack immediately take place, and the patient recovers herself before the prescription can be executed. If simulated diseases are more frequent in females than in males, as *Morgagni** has remarked, the vanity peculiar to their sex supplies the physician with additional means of discovering the deception. → M.

* *Sexus ad fallendum pronus.*

[*Feigning of Disease.* — This subject, which must always be of very great interest to the physician, is somewhat differently considered, as to its divisions, by various authors. The distinction drawn by Chomel between concealed and simulated diseases (*Maladies Dissimulées, Maladies Simulées*, p. 338), seems well founded and desirable. Nysten and Dunglison consider the terms as synonymous, and the latter groups all diseases of the *deceptive* class, under the appellation “Feigned Diseases,” of which he gives a very complete list, with the *mode* of imposture and means of detection: this list, which is far more complete than the enumeration of our author, should be referred to in this connection. — (Dunglison, *Med. Dict. Feigned Diseases*.)¹ A highly interesting and complete account of Feigned Diseases and the ingenious methods adopted for their detection, etc., is contained in Copland’s *Med. Dictionary*, art. F. Diseases. Soldiers, who are also termed “*malingerers*,” and sailors, known as “*skulkers*,” with *mendicants* and *prisoners*, constitute the larger number of such impostors. But names of greater note “*grace*” (to use the expression of Dr. Copland) that class of “*malingerers*” who wish to accomplish, by such procedures, any object of private or political ambition, or to compass any particular end. Among these are mentioned Amnon the son of David, Ulysses, Solon, the elder Brutus, etc.; and in later times, Northumberland, the Earl of Essex, and Raleigh. In addition to the description in “*Guzman d’Alfarache*,” the ingenious devices employed by the Parisian mendicants to obtain the means of existence are graphically described by Victor Hugo in his *Notre Dame de Paris*, chap. vi.: the revelations of the “*Cour des Miracles*” are at once astonishing, ludicrous and thrilling. Feigning has been suspected, when actual disease existed, as was proved by post-mortem examination — (Copland.) This should render the physician scrupulous in regard to a hasty verdict. Hysteria *may* be real, although sternerutatories, as recommended by Dunglison, produce their usual effect. “Detection is by no means easy.” (Copland.) The “concise rules for the detection of feigned and factitious diseases, from Guy’s *Forensic Medicine*,” (Copland, *Op. Cit. Dr. Lee*,) should be familiar to the practitioner. External, are more frequently feigned than internal, diseases, for the obvious reasons that they are more constantly manifest and more easily simulated.

We now possess an agent of unlimited power, as it would seem, in the detection of feigned diseases; viz. the *inhalation of the vapor of sulphuric ether*; whether its efficacy be shown as a revealer of *external* alterations, by enabling the physician to examine the body more carefully and easily, the patient being in a state of insensibility, or in removing, as if by magic, the factitious deformities of the body itself, which, by long practice, the patient is enabled to produce at will and preserve for an indefinite period. The only cases which we have as yet noticed of

¹ Synonymes: — Simulated Diseases; Pretended Diseases; Feigned Diseases; Excited Diseases. — (Fr.) *Maladies dissimulées. M. simulées, M. feintes. M. supposées.* — (Dunglison.) *M. dissimulées. M. simulées.* — (Nysten. *Dict. Med.*)

CHAPTER XVII.

PROGNOSIS.*

PROGNOSIS is the previously expressed opinion in regard to the changes about to supervene in the course of a disease.

It is that part of medical science which gains most reputation for a physician among a large class, who, not capable of appreciating accuracy of diagnosis, are always able to verify an opinion given as to the duration and result of a disease. On this account nothing is better suited to win the confidence of the patient and his attendants, than a confirmation of the prognosis by after events, and nothing injures the physician's reputation more than error in this respect.

Prognosis does not consist alone in foretelling that a disease will, or will not, prove fatal; it enables us to recognize, among affections which are not fatal, those which will terminate in complete restoration to health, those which will remain stationary, and those which will diminish or increase gradually during life, at periods which we can sometimes determine. Prognosis is also applicable to the accidental symptoms which may supervene, such as delirium and convulsions; likewise to the period when the disease will terminate, sometimes even to the critical and consecutive phenomena and the danger of relapse and recurrence.

§ I. The necessary conditions on the part of both physician and patient, in order to the greatest accuracy in prognosis, are the same that have been mentioned in regard to diagnosis. (p. 275.)

When we notice, from the earliest days of medicine, (a time when the diagnosis of most diseases was incomplete or erroneous,) that rules for prognosis were established by observers, which are cited as models in our times; and likewise that persons almost wholly unacquainted with medical knowledge, especially those who devote their time to attendance upon the sick, exhibit daily a certain skill in foreseeing the issue of diseases, we might be led to conclude that diagnosis possesses only a secondary utility in forming prognosis, but we should be greatly deceived.

this application of ethereal inhalation, are reported from M. Baudens in the Medical Gazette for March 19th, 1847. These were cases of conscripts suspected of feigning diseases for the purpose of avoiding service. One of them had, apparently, outward curvature of the spine in a marked degree. Inhalation produced total disappearance of the deformity. The other case illustrates the advantage to be derived from the use of ethereal inhalation where feigning is suspected but disease actually exists, as has been previously noticed. The person was supposed to feign ankylosis of the hip-joint. Relaxation of the *muscles* was the result of inhalation, but the *reality* of the *ankylosed state* was proved by thorough examination. — TRANS.]

* Προγνώσις; πρὸ, before; γινώσκω, I know.

There are, it is true, certain cases in which the first glance at the patient enables us to judge immediately of his danger, even before we ascertain the disease by which he is attacked; but in the first place, these cases are not the most common, and even in these, where prognosis seems so clear, a thorough examination of the patient is by no means superfluous. Oftentimes, when the diagnosis has been established, it is discovered that the original opinion in regard to the gravity of the disease must be rectified. Certain fatal affections declare themselves by their diagnostic signs a long time before the face presents any indicative impression, and some affections not dangerous in their nature, as for example, anæmia, and certain intestinal pains, alter very much the color of the skin, and also the features, while the prognosis is far from unfavorable. A thorough knowledge of diseases is to the physician an indispensable condition in properly establishing his prognosis; we may even add, that in order to acquire great skill in prognosis, more time and experience are requisite than for accurate diagnosis. Prognosis, indeed, often presents great difficulties in cases where diagnosis has none, and in those where diagnosis is obscure, prognosis is likewise necessarily so. If we except those cases where there can be but one termination, (and these are the rarest cases,) prognosis is always a delicate question in diseases of a certain degree of gravity, and especially in acute diseases. In order to form it, the physician is obliged to compare the case he is actually observing, with all the analogous cases he has previously observed; if the result has been constantly either favorable or unfavorable in all, the prognosis cannot be doubtful; but if it has been at one time favorable, at another the contrary, it is, then, necessary to compare the various conditions which have accompanied a disease apparently similar both in those who have recovered and those who have died, and to ascertain to which of these two groups the case in question should be assigned. But this comparison of cases is only valuable when the physician has previously made many and careful observations. Much time is required in order to understand fully all the forms of a single disease, all their tendencies, and all the accidents which may disturb its course, and this practical knowledge is a necessary element in prognosis. A few years devoted to clinical study may suffice to enable one to form a correct diagnosis; but to acquire excellence in prognosis, which does not consist, like diagnosis, in the appreciation of existing facts, but in foreseeing future events, an entire life devoted to observation scarcely suffices to accumulate the mass of facts necessary for the solution of the complex problems which are daily presented to the physician; in many cases, moreover, even the longest and most enlightened experience only enables us to avoid an erroneous opinion, and to establish with more precision the various chances appertaining to each particular case.

§ II. Under the term *prognostic signs* is comprised all which may enlighten the judgment of the physician upon the future course

of the disease; they are to be discovered in the most exact appreciation possible of the actual state of the patient, and, consequently, of what has preceded, while forming the diagnosis. Diagnosis is, in fact, the original and chief basis of prognosis. If diagnosis be obscure, prognosis is uncertain. It is only when diagnosis is clear and complete, that is to say, when it comprehends all its constituent elements (p. 311), that prognosis can and should be established, according to the cases, at one time positively, at another, with reserve, and with a methodical appreciation of the various chances presented by the disease. Independently of the prognostic signs afforded by the seat and nature of the disease, the physician will find still others in its natural tendency towards various terminations, in the degree of efficacy of remedial measures, in the peculiar conditions relative to age, sex, constitution, causes of the disease, antecedent phenomena, mode of attack, course, duration, effect of remedies first employed, and, in certain cases, complications and epidemics. Finally, without attaching so much importance to particular symptoms as most authors on semeiology have done, we still think it our duty to glance rapidly at the prognostic value of the principal symptoms.

1. It is hardly necessary to enlarge upon the proposition already stated, viz., *that prognosis is based upon diagnosis*, understanding diagnosis to be the exact knowledge of the disease in regard to its material lesions and symptomatic phenomena.

The character of the lesion, when one exists, and the degree of its development, are, in connection with the extent of such lesion, the primary conditions of prognosis. A lesion inflammatory in its nature, is not, in general, at all serious, when it occupies an organ of minor importance and for a limited extent; it becomes more serious when its extent, both superficial and profound, is increased, and when seated in a part whose functions are more important. In herpes zoster, which is wholly exempt from danger; in general peritonitis, which is almost constantly fatal, the prognosis is easy. In visceral inflammations, whose termination is most frequently favorable, though sometimes the contrary, the prognosis should be formed with great reserve, in order equally to avoid inspiring the patient's attendants with too great security, or excessive anxiety. The prognosis is still more difficult and delicate in certain affections, as the eruptive fevers, in which a deleterious agent, existing in the system, may at any moment occasion formidable accidents, which nothing seemed to indicate, and which, in many cases, are in no wise explained on post-mortem examination. But of all acute affections, typhoid fever presents the most difficulty in regard to prognosis; in this disease, we at one time behold the most formidable accidents terminate favorably, and again, the mildest symptoms in appearance, become suddenly exasperated and terminate in death. This sudden exacerbation is sometimes caused by perforation of the intestine.

In those diseases called organic, the prognosis is generally easy; when once the disease is ascertained, there can remain no doubt as

to its future course, and its definitive termination. Tubercle and cancer never retrograde, and their progressive extension most frequently induces marasmus and death. The difficulty of prognosis in this case consists only in the appreciation of the time during which the struggle will continue.

The degree of development attained by the lesion is likewise highly important in prognosis. Pneumonia in its third stage is generally fatal; and necessarily so, if it occupy a considerable portion of the pulmonary parenchyma. Softened tubercles and ulcerated cancer cause more immediate anxiety than crude tubercle and scirrhus.

The seat of the disease has likewise great value in prognosis. The lesion being the same, the danger is necessarily subordinate to the importance of the affected part and the extent to which it is affected.

The local and general symptomatic phenomena, which, as we have seen, are very valuable in a diagnostic point of view, furnish, moreover, very important signs for prognosis. Excessive dyspnœa in thoracic inflammations, considerable irregularity in the pulse in pericarditis, and frequent vomiting in gastritis, add greatly to the gravity of the prognosis. In every acute disease, general phenomena of a grave, adynamic or ataxic nature are replete with danger.

2. The *powers of nature, and of our science*, are to be well considered in prognosis. A large number of chronic diseases, connected with deep-seated organic lesion, resist every effort of nature or art: of this number are organic affections. There are other diseases in which nature alone is almost constantly powerless, as cataract, vesical calculi and syphilis, and in which the interference of art can secure recovery. In some cases, as in malignant intermittent fevers, death is the inevitable and prompt termination of the disease, if artificial means are not resorted to. The efficacy of quinine in intermittent diseases greatly diminishes the gravity of the prognosis in affections presenting this *type*. Lastly, there are other diseases, where the concurrence of natural and artificial means can, in most cases, (although not in all,) lead to the recovery of health, as is observed in severe fevers and in visceral inflammations.

3. The *peculiar conditions of sex and constitution* must not be neglected in a prognostic point of view; but the *age*, the *previous good or bad health*, and the *physical and moral causes* which have affected the organization, furnish far more important prognostic signs.

Other things being equal, an acute disease, and especially an inflammation supervening in a strong and well constituted individual, who had previously enjoyed good health, is far more likely to terminate favorably than when it appears under opposite conditions.

In similar circumstances, *age* presents results no less remarkable. Diseases are generally more severe and more frequently fatal at the extreme periods of life, with this difference, that in

early infancy, the most violent affections are never entirely hopeless; infancy is the *age of resurrections*; the well known adage *ubi vita, ibi spes*, is applicable to infancy; while in the aged, acute diseases, when they assume a grave form, almost inevitably terminate in death. In adult age, the changes are more favorable, and still more so in youth and early manhood. Pneumonia is one of the most remarkable examples of this fact. According to the clinical records of the Hotel Dieu, the mortality in this disease is less than one twentieth in those from fifteen to twenty years of age, it is about one fourth in adult age, and one half in patients of sixty years and upwards. There are, however, certain diseases to which these considerations are not applicable. The eruptive fevers, for example, are less dangerous in infancy, and some organic affections, as scirrhus and tubercle, most frequently remain stationary, or, at least, progress more slowly in the aged.

There is an *hereditary condition* which renders certain diseases much more grave, or even constantly fatal, in nearly all the members of the same family. This remark, made by *Méara*, is confirmed by the observations of *Morton*, who has seen variola * quite as dangerous in certain families as the plague.

The diseases developed in *females* at the period of *menstruation*, and especially during *pregnancy*, are, in general, more severe. In the first case, suppression of the menstrual discharge, or uterine hæmorrhage, often supervenes; in the second, abortion frequently takes place, and this circumstance, which nearly always proves fatal to the child, aggravates in every way the condition of the mother, and frequently results in her death.

The *puerperal state* adds very much to the danger of those acute diseases which supervene during its continuance; serous and parenchymatous inflammations pass rapidly into the suppurative stage, and the eruptive fevers often appear accompanied by ataxic or adynamic symptoms. The diseases developed under these conditions are the more serious in proportion to their proximity to the moment when delivery took place. Observation has shown that a severe chill, supervening immediately after delivery, denotes the invasion of an acute disease, whose termination will almost always be unfavorable and sudden. If the disease does not appear for several days, the prognosis will be far less serious, and still less so, if one or two weeks elapse between the labor and the onset of the disease.

Habitual intemperance adds infinitely to the unfavorable circumstances of disease. Many physicians have observed that the acute affections which supervene in the intemperate are almost constantly fatal. Habitual excess in eating adds likewise to the danger, but in a less degree. Those diseases which succeed a long *famine*, or the nearly exclusive use of food of a bad quality, or not sufficiently nutritive, usually terminate unfavorably. *Ascetics*, who use a diet almost entirely vegetable during Lent, incur

*MORTON, *de Variolis*, chap. vi.

far more danger in those acute diseases with which they may be attacked, after this long abstinence.

Excessive evacuations, considerable and prolonged *fatigue*, *excessive* venereal indulgence, the practice of masturbation, *watchings*, unremitting *mental labor*, and long continued *grief*, are all circumstances nearly always rendering the course of diseases unfavorable. We have observed quite a number of grave affections developed in individuals who had recently lost an employment upon which their means of existence depended: all of them died.

Habitual ill health, and chronic disease preceding an acute affection, in like manner render prognosis more unfavorable. If a circumscribed inflammation, as erysipelas, even of slight intensity and limited extent, be developed under these conditions, we most frequently see the patients sink into a state of extreme prostration and die in a few days. The same observation is applicable to patients just recovering from an acute affection which has greatly debilitated them, and in whom a new disease supervenes.

Climate and season, which modify the course and duration of certain affections, are also capable of varying the prognosis. For this reason, dysentery is not only more frequent, but also far more severe, in hot than temperate climates, while syphilis, which among us often exhibits grave and obstinate symptoms, is in southern climates, on the contrary, generally mild and easily treated.

4. *Precursory phenomena* are of little value in prognosis: when, however, a disease is preceded by loss of flesh, which has increased progressively for several months, grave symptoms and a fatal termination may be apprehended.

5. The manner in which diseases *commence* merits also some attention: those whose invasion takes place by violent alternate chills and heat, which continue for one or more days, those which begin by syncope, violent delirium, and sudden prostration, most frequently terminate unfavorably and suddenly.

It should, however, be remembered, that prognosis can rarely be positively established at the commencement of diseases. The successive development of symptoms is quite as necessary in deciding the opinion of the physician upon the ulterior course of the disease, as upon its seat and nature. Even at the period when diagnosis is no longer doubtful, prognosis will often still remain so, and this uncertainty may be prolonged even to the last period of the disease, sometimes even to the moment when death dispels all doubt and destroys the latest hope. In the midst of this violent disturbance of the organism, where the danger is only too evident, prognosis varies necessarily with the varying disease. The skill of the physician consists, at such times, in carefully appreciating the different elements presented to his observation, in calmly analyzing the favorable and unfavorable chances in the daily modifications of the disease, and, lastly, in being on his guard, in view of the great changes presented by the symptoms, against a deceptive security and a premature discouragement.

6. The *progress* of the disease is of some importance in prognosis, especially when it is regular. When the symptoms increase gradually in intensity beyond the ordinary limits of the period of increase, the prognosis is unfavorable: it is favorable, on the other hand, if their violence diminish from day to day; it is almost always uncertain when the course of the disease is irregular. A sudden change, either favorable or unfavorable, is far less important in regard to the prognosis than one which takes place slowly. The latter almost always announces, with certainty, the favorable or unfavorable termination of the disease; while a sudden amelioration is always suspicious, as likewise a sudden aggravation, without appreciable cause, is generally more alarming than dangerous.

7. The *duration* of the disease is also one of the elements of prognosis: neuralgia of many years' continuance, old and consolidated fracture, and dislocation of many months' standing, are affections nearly always incurable; when recent, on the contrary, they generally yield to the treatment employed.

8. The influence of *previous treatment* deserves much attention: if the use of remedies, properly or improperly administered, has been followed by marked improvement, the prognosis is favorable, but if, notwithstanding the treatment, especially when most distinctly indicated, the disease continues to progress beyond the usual limits of its period of increase, it is, at any rate, very grave, although it may not necessarily be, on that account, incurable or fatal.

9. *Complications* greatly increase the gravity of the prognosis; in the first place, because there are, at once, many sources of danger, and many enemies to resist, and also because, in many cases, each of the diseases adds to the gravity of the other: thus, when acute dysentery is complicated with cancer of the large intestines, it is more dangerous, because developed in an individual already ill, and sometimes exhausted, and the progress of the cancer will be hastened by the acute affection of the intestine. We have previously indicated the gravity of erysipelas when it supervenes upon another disease, while simple erysipelas is almost always without danger.

10. When a disease *attacks many persons simultaneously*, the prognosis in regard to each particular case is more or less grave, in proportion as the actual general mortality is greater. There are certain epidemics in which the inhabitants are less severely affected than strangers, females less so than males, infants than adults, feeble than robust persons, and *vice versa*. In every epidemic, there is a period of increase, during which the number of patients augments daily, and the disease becomes more grave in most of the cases; a period of violence, during which the number of patients and the severity of the disease are at their *maximum*; a period of decline, when both diminish simultaneously. It has likewise been observed in certain epidemics, that there was, as it were, a focus, where the disease appeared in all its energy, and

that in proportion to the distance from this spot, a smaller number of individuals were attacked, and each with less intensity. These different circumstances should be taken into consideration when pronouncing an opinion upon each patient during an epidemic.

11. In the writings of the ancients, particularly in those of Hippocrates, the *symptoms*, either isolated or grouped together, furnished, in themselves, the elements of prognosis. At this day, when the diagnosis of diseases has acquired a degree of accuracy to them unknown, the importance of those signs furnished by the symptoms has doubtless much diminished; but it is still of sufficient power to make it impossible for the physician to neglect noticing these signs, when forming his opinion upon the ulterior course of a disease.

It is unnecessary to enumerate here, as in treatises upon semeiology, the unfavorable or favorable signs which are observed in the course of each particular disease: we shall confine ourselves to the presentation of those which may be exhibited in most of them, and which, for this reason, belong to the domain of general pathology.

External appearance furnishes many prognostic signs of considerable importance. Constant change of position awakens no apprehension at the commencement of acute diseases; but it is otherwise when it continues for many days. It is a still more unfavorable sign, when the patient maintains unceasingly the same position, as, for example, the dorsal decubitus, as is seen in typhoid fever of adynamic form; it is likewise a grave sign if he be obliged to remain constantly in a sitting posture, as occurs in certain thoracic affections. When jactitation succeeds immobility in the latter period of an acute affection, it is generally a fatal sign, especially if the patient uncover himself, and if he make unavailing efforts to rise.*

The progressive loss of flesh which supervenes in acute diseases, is but of slight importance, but in chronic diseases we should apprehend from it a fatal termination, which is nearer at hand in proportion as the marasmus is more rapid. The œdematous infiltration which is manifested during the course of chronic diseases, is likewise a most unfavorable sign. This is not the case in respect to partial œdema, confined to the malleoli, which is observed towards the close of acute diseases, and is connected with the state of prostration and languor of most of the functions; this, in general, is not at all serious. The eschars which are formed in different

* Among other prognostic signs, one which is always considered grave, may be appropriately added to those here mentioned, viz. *the sliding down in bed*, noticed particularly in typhoid fever; the patient's lower extremities often protruding to some distance from the foot of the bed; this doubtless arises from excessive debility, and although the state in which it is observed is attended with more or less danger, it is not incompatible with recovery, except, indeed, there be concurrence of a great number of unfavorable signs, as subsultus tendinum, coma, hiccough, involuntary evacuations, rapid and fluttering pulse, labored respiration, etc. etc. — TRANS.

parts of the body, and particularly upon those where the bones are near the integuments, are unfavorable signs in chronic diseases: they are also nearly always so in acute diseases, and particularly in typhoid fever and affections of the spinal chord; not only because their appearance adds to the original disease a phenomenon which fully reveals its gravity, but still farther, because the eschar becomes in certain cases, when the primary affection has disappeared, a source of debility and death by the abundant suppuration which it furnishes, the denudation of the bones, the purulent absorption, and, in certain cases, by the exposure of the rectum in the pelvic cavity.

The physiognomy is very important in prognosis; but it addresses itself, if we may so express ourselves, only to the practised eye. When the natural expression is preserved, the prognosis is very favorable. A remarkable change in the countenance, from the first of an acute disease, should lead us to apprehend, that at a later period, as from the fifth to the ninth day, adynamic or ataxic symptoms may supervene. At an advanced period of either acute or chronic affections, a marked and sudden alteration of the countenance announces the approach of death. If this change of countenance take place at a time when death seems still distant, we should suspect the development of some acute inflammation, which, in the state of prostration to which the patient is reduced, most frequently does not give rise to any of the local symptoms which ordinarily reveal it, and only determines a sudden aggravation of the general condition.* Those in whom this is observed rarely survive more than three days; most frequently they die in a still shorter time. — The rapid *increase of stature*, which takes place in young patients during acute diseases, is also a sign almost constantly unfavorable.

Tremor, stiffness and subsultus tendinum always indicate danger; picking of the bedclothes, and particularly epileptiform or tetanic convulsions and rigidity of the limbs, are usually fatal in fever, when they supervene at an advanced period; convulsions occurring at the commencement of diseases, particularly in children and in the eruptive affections, are not so serious. The irregular movements of the limbs, which the patient seeks to uncover, although they are cold, are of equal value with convulsions as regards prognosis; trismus, the sardonic grin and strabismus, are of like significance. Another sign, still more unfavorable, is the almost automatic movement by which the patient strives unceasingly to bring his arm to his side, while the physician detains it outside the bed in examining the pulse; we have always observed these cases terminate fatally, but very few authors have mentioned this sign.

Aphonia is one of the most unfavorable signs that can be observed in acute diseases. Many of the patients, however, who presented

* We should not confound this change of countenance with pallor of the face, which denotes the cessation of the fever and the commencement of convalescence; the two differ very much in themselves and the opposite phenomena which accompany them.

this symptom in the epidemic typhus observed at Presburg, in 1683, and described by Læw, recovered. We have seen recovery take place in patients with typhoid fever, who had been aphonic for many days.

Aphonia supervening during a chronic affection of the chest, and persisting, is always a grave sign, because it leads us to fear the development of tubercles in the larynx, and also to conclude that they exist in the lungs.

The intensity of pain in disease is not generally in proportion to the danger: the most serious diseases are not usually accompanied with more than moderate pain, many indeed are entirely free from it, and those affections in which pain causes cries, as hepatic, nephritic and lead colic, neuralgia, rheumatism, etc. rarely terminate unfavorably. In certain chronic affections, however, prolonged and intense pain, preventing sleep, concurs in exhausting the strength, and renders the prognosis less favorable, independently of the disease.

Other things being equal, deep-seated pain is more unfavorable than that which is superficial, and fixed pain, than that which is moveable. Very severe pains in the limbs at the commencement of a disease indicate its future severity; those occurring at the decline of an acute affection are favorable. In the phlegmasiæ, the sudden cessation of pain, joined to a marked change of the countenance, indicates the approach of death; the gangrene announced by most authors, is rarely discovered, in these cases, on post-mortem examination; the inflamed part is most commonly in a state of suppuration, as all those physicians who make frequent dissections must be convinced.

The various disturbances to which the organs of sense are exposed, rarely supply us with prognostic signs of much importance in regard to the termination of the disease; in some cases, however, they are the forerunners of delirium, coma, or some other accident. Most authors have supposed that deafness was of certain value as respects prognosis: but some have considered it a favorable, others an unfavorable, sign; several have regarded the deafness occurring towards the close of the disease as favorable, and that noticed at the commencement as unfavorable. In our opinion, the deafness which is independent of any material lesion of the ear, and which appears as a sympathetic phenomenon in various acute diseases, always indicates serious danger: it is not observed in mild diseases; it is noticed only in those which exhibit more or less of the *ataxic character*, and particularly in typhoid fever. By a comparison of the fatal cases, both among individuals who had been affected with deafness during the course of this disease, and among those who were exempt, we have been led to the conclusion that in the former the mortality has been nearly double that of the latter class.

The mild and moderate passions, as hope and gaiety, are generally favorable signs in disease. The depressing passions, on the contrary, as hatred, jealousy, discouragement and despair, are of the most ominous presage. It is rare that patients recover from an

acute affection, with which they are persuaded they shall die, unless they are hypochondriacs; depression is then not so unfavorable a sign. We have had various opportunities of being convinced of this, particularly in the case of a young man of melancholic temperament, whom we attended during an attack of typhus fever. From the first of his illness he had arranged his affairs, and written a very pathetic letter to his father; the apprehension of death followed him unceasingly until delirium appeared. During this period, when asked how he was, he promptly replied *very well*, which is noted by Tissot as constantly a fatal sign; the disease, however, terminated favorably on the fourteenth day, and the recovery was complete.

We should not mistake for safety, either the affected calm of some patients, nor that prostration of the intellectual faculties which deprives the individual of the knowledge of his situation, and consequently of the danger which threatens him; this absolute indifference is a grave sign, and appertains in a special manner to one of the most dangerous forms of typhoid fever. A certain degree of uneasiness, in proportion to the gravity of the disease, is the ordinary condition of the patient, complete security is unnatural, and consequently does not encourage the physician; in acute diseases it should cause him to fear commencing delirium; in chronic diseases, and especially in pulmonary phthisis, the feeling of security in the patient does not at all diminish the gravity of the prognosis.

The prognostic signs furnished by delirium are subordinate to its intensity, persistence, and the conditions in which it appears. Quiet and transient delirium, which consists in a simple wandering from which the patient may be easily recalled, is not very serious; when permanent, especially if violent, and if the strait waistcoat be necessary, it is always a bad sign; it becomes still more so, if the individual be advanced in years. There are, however, individuals even among adults, who are delirious during the course of almost all the diseases with which they are affected, even in ephemeral fever, and simple angina; a knowledge of this idiosyncrasy in patients is sufficient for the appreciation of the value of this symptom.

Prolonged sleep need cause no alarm in fevers when the patients awake easily to take liquids, and answer the questions addressed to them; but when it becomes necessary to shake them, or to shout aloud in order to wake them, the prognosis is serious.

When the sleep is not quite so profound, we must, according to the recommendation of *Piquer*,* regard the other symptoms, in order to judge of the value of this sign; if they be dangerous, the sleep is so likewise, and *vice versa*.

Prolonged sleep may, in certain cases, be a good omen; in the delirium which succeeds capital surgical operations and in *delirium tremens*, if the patients sleep calmly for a certain number

* *Traité des Fièvres*, p. 285.

of hours, on awaking, they most frequently have completely recovered their intelligence, and do not remember their delirium. Coma and sopor caroticus are very grave signs, and are almost always fatal when intense and continued. There is more hope when they take place at the commencement of disease, in cases, for instance, of hæmorrhage or concussion of the brain, than when they succeed delirium or convulsions, as occurs in inflammations of the brain.

Anorexia is not at all unfavorable in acute, any more than the diminution of appetite in chronic diseases; but in the latter, disgust at food is a bad sign. A voracious appetite, which supervenes suddenly in the violent stage of an acute or even a chronic disease, without diminution of the other symptoms, according to *Baglivi*, announces death in twenty-four hours; we have seen death succeed this irregular hunger almost constantly, as this physician has remarked, but some of the patients lived until the second, and even the third day. Pneumonia, in our experience, has furnished the most instances of this sign.*

Slight thirst is generally a phenomenon of little value in a prognostic point of view; but extreme thirst, supervening in an individual apparently healthy, always arrests the attention of the physician: it is frequently the first sign of commencing diabetes, and sometimes of pulmonary phthisis. We shall always vividly remember the death of two men, in mature age, with this latter disease, both remarkable for their strong constitution and embonpoint, in whom the same phenomenon, a thirst so violent, that every evening, for nearly a year, they were obliged to drink one or two pints of water, preceded the manifestation of tuberculous disease, which rapidly destroyed them.

Observation has shown the exaggerated importance which has been attributed to the different modifications presented by the tongue in disease, in reference to the diagnosis of stomachal and intestinal affections; it has confirmed, on the other hand, the value of the prognostic signs furnished by this organ. The dryness, ligneous hardness, shrinking and tremulousness of the tongue, and the difficulty of protruding it, are, at present, as in the days of Hippocrates, very grave signs, and indicate great danger. The various coats which, in the forms of aphthæ, pellicle and pulp, cover the mucous membrane of the mouth, especially when they constitute a thick layer, and become renewed immediately after they are detached, are prognostic signs of great value in acute, and still more so, in chronic, diseases; in the latter they announce a termination almost inevitably fatal, in the former they increase the

* This has also been noticed in the last stage of *phthisis*. The case of a young man in this stage of the disease recurs strongly to our recollection at this time, whose craving for food was so irresistible as to lead him, while travelling by railway, to snatch from the hands of a child some cake it was eating, much to the astonishment of his fellow passengers; for some time his whole attention had been directed to satisfying this unnatural appetite: this individual, however, lived for a fortnight after the above occurrence, making the voyage from England to this country, and dying on the day of his arrival home. — TRANS.

gravity of the prognosis, without being so constantly the indication of an unfavorable termination.

Difficult deglutition, but more particularly, inability to swallow, are signs of most unfavorable augury in cerebral diseases and in those acute affections in which the examination of the fauces does not show the cause of the dysphagia. — Hydrophobia or horror of liquids, with spasmodic contraction of the pharynx, is a still worse sign, with the exception of those cases of pregnancy, hysteria and inflammation of the stomach, in which this phenomenon has frequently been observed. — That alteration of deglutition in which liquids pass through the œsophagus as through an inert tube, and fall noisily into the stomach, has for a long time been noticed as announcing the approach of death.

The continual nausea observed in certain acute diseases is a grave sign; it is frequently the prelude of that obstinate bilious vomiting which generally resists all remedies, and finishes, in the greater number of cases, by causing death, the cadaveric examination not always accounting for the intensity of the symptom.

In the last stage of certain diseases, as peritonitis and intestinal occlusion, regurgitation takes the place of vomiting; death is then imminent.

The danger arising from hæmatemesis, and stercoraceous, purulent, or rice-water vomiting (Asiatic cholera), is subordinate to the intensity and persistence of the symptom, but more particularly to the kind of disease which causes it. Here, as in all cases, the prognosis is in a great degree the consequence of the diagnosis.

Meteorism, when considerable, is always a serious sign, both in acute diseases, as adynamic fevers and the various forms of peritonitis and in chronic diseases, where its occurrence should lead us to fear complete occlusion of the intestines or some other dangerous lesion.

Constipation does not become a serious sign, except when it resists remedies, and is accompanied with vomiting, as in the different kinds of ileus, a complex phenomenon, which always depends upon a material lesion interrupting the course of the fæcal matter through the intestines.

Diarrhœa, especially when it resists diet, suitable remedial means, and time, and when the discharges are both numerous and liquid, is a grave symptom, both in acute and chronic affections; it leads us to fear the existence of ulcerations or softening of the internal tunic of the intestine. Obstinate diarrhœa, accompanied by hectic fever and morning sweats, is nearly always a fatal sign; it is an almost certain indication of a tuberculous affection, even in those who do not cough, and in whom the various modes of exploration of the chest reveal no lesion of the contained organs. A black color and cadaverous odor of the fæcal matter are unfavorable signs. Intestinal hæmorrhage, supervening in the course of an acute disease, is a grave symptom, observation having shown that this hæmorrhage hardly ever occurs except in typhoid fever, and that it is followed by death in at least one half of the cases.

Involuntary evacuation of the fæces and urine is, moreover, a very grave sign in acute diseases, especially when the patient is unconscious of it; we should apprehend from this symptom the near approach of death. It is not a sign of equal gravity when the intellectual faculties are disordered; but even then, it adds to the seriousness of the prognosis.

The signs furnished by the respiration should be ranked among the least deceptive. When respiration is uniform, free, not accelerated, exempt from pain and oppression, when the interval between inspiration and expiration is not too long, and the patient respire well in all positions, we may hope for a favorable termination. On the contrary, very frequent respiration indicates great danger; the elevation of the respiration to fifty in a minute is a sign nearly always fatal. Stertorous respiration and tracheal rattle are most usually the phenomena of the agony, particularly when they supervene in the latter period of cerebral diseases; stertorous respiration, however, is not so grave in pulmonary inflammations when expectoration is not interrupted.

"Short and accelerated respiration, that is, respiration made up of small inspirations and expirations, which succeed each other rapidly, is a very bad sign, even when all the other signs seem favorable;" "for this reason," says *Stoll*, "whenever I do not observe this sort of respiration in putrid or malignant fevers, and even in inflammations of the thoracic organs, I never despair; but I have never seen any patient who had this symptom, recover." *

Embarrassed respiration occurring in paroxysms, although not without gravity, is far less dangerous than permanent dyspnœa. In pulmonary emphysema, paroxysms are often noticed in which the oppression almost amounts to *asphyxia*, and nothing is more unusual than the death of patients during these paroxysms.

Hiccough is a very unfavorable sign towards the close of diseases, when unaccompanied with marked amelioration of the symptoms.

The sputa furnish important prognostic signs. In peripneumonia, when they are serous, red, or like the juice of liquorice or prunes, and slightly frothy, the disease constantly terminates fatally, even when, in other respects, it seems mild in its character. In phthisical patients, when the sputa, from having been a long time mingled with *diffluent mucus*, become entirely purulent, or when they are of a dirty gray color, and exhale a fetid odor, death is generally not far distant. A brown color and gangrenous odor of the sputa announce a fatal result.

The pulse, considered in regard to prognosis, supplies us with few, but important, signs, especially in acute affections. It is always encouraging when the pulse presents a moderate frequency and a certain degree of development in these diseases. Considerable frequency of the pulse constantly denotes a serious disease. If the pulse, in an adult, rise to one hundred and fifty pulsations in a minute, and more especially, if beyond that, the prognosis is

* *Stoll*, *Rat. Med.*, tom. iii. p. 62.

unfavorable; * if, at an advanced period, the pulse become irregular, unequal, intermittent and imperceptible, death is imminent. Moderate irregularity of the pulse, without any other aggravation of the disease, sometimes precedes and announces a favorable change.

Faintness and syncope are often more alarming than dangerous, especially when they supervene in persons who are not, as yet, much debilitated; it is quite otherwise, when they occur in the opposite conditions; they should then cause the most serious and instant anxiety.

A considerable increase of heat generally denotes a grave disease, especially when the heat is dry. Coldness of the extremities, extending afterwards to the rest of the body, supervening during the course of a disease, together with diminution of the strength, and aggravation of most of the symptoms, should cause apprehension of an approaching fatal termination. This is not the case with that coldness which takes place at the commencement of disease, and which is not equally grave, although in some of its forms (p. 346), it may be an unfavorable prognostic sign. The irregular chills which supervene at an advanced period of the disease, should excite suspicion, either of the formation of pus in inflammatory affections, or of its absorption when there already exists a purulent collection, as after extensive injuries and particularly solutions of continuity.

Suppression of the cutaneous exhalation, which is known by the dryness of the skin, is, generally, if not a dangerous, at least an unfavorable sign; suppleness of the skin, accompanied by a gentle perspiration, is, on the contrary, a favorable circumstance.

Abundant sweats are generally injurious, or at least useless, at the commencement of diseases; they are often favorable at their decline. Continual sweating, in the course of an acute affection, often produces destructive prostration, as was observed by *Cotugno* in the *hectic fever* at Naples. The cold sweats which supervene at the decline of diseases are nearly always unfavorable; we have, nevertheless, seen them establish a favorable crisis in a child

* "In most grave diseases, a pulse which at all hours exceeds one hundred and twenty indicates serious morbid affection, and a pulse of one hundred and forty, if long-continued and feeble, is indicative of danger." — (*American Editors of Marshall Hall's Theory and Practice of Medicine*, p. 49.) According to our author, also, a pulse of one hundred and fifty and over, in the minute, renders the prognosis unfavorable; we remember hearing him remark, that he had never known a patient to recover who presented the above frequency of pulse, for any considerable time, in acute disease. The case which elicited the remark was one of typhoid fever, where the pulse was so rapid that *it could not be counted*; death ensued in a few hours. According to Dr. Copland, (prognostic signs furnished by the pulse in continued fever,) "the pulse, to the experienced physician, furnishes the chief indications of danger, as well as of treatment; if it reach one hundred and twenty, the danger is very great, if it amount to one hundred and thirty, recovery seldom or never occurs, unless in cases of hysterical and irritable females, or those in the puerperal state." — (*Med. Dict. Am. Ed.* p. 1135.) Dr. Graves has remarked, that where the respirations are very numerous (forty, for example), with a *comparatively infrequent* pulse (eighty or ninety), a fatal result may generally be anticipated. — TRANS.

six years of age, on the seventh day of very grave peripneumonia; a prompt amelioration of the local and general symptoms succeeded the cold sweat, by which the parents had been exceedingly alarmed.

Hæmorrhage occurring at the commencement of a disease generally announces its future severity; that which supervenes in the last period is rarely indifferent; it is most commonly followed by a marked increase or diminution in the pre-existent symptoms. Epistaxis, hæmorrhoidal discharge and metrorrhagia, are generally favorable in those who are subject to them during health; pulmonary and intestinal hæmorrhage are generally unfavorable; that from the urinary passages is almost constantly fatal, as has been observed in variola (Sydenham), in the plague (Diemerbroeck), and also in yellow fever.

The old physicians asserted that transparent and crude urine indicated a lengthy disease; that substances remaining suspended in it when cool, announced the termination of the disease at a period more or less distant; sedimentary deposit, an approaching termination, etc. There is nothing certain in these various signs. The involuntary excretion or retention of urine supervening in the course of febrile affections, or in those of the medulla spinalis and the brain, most frequently indicate great danger.

The state of the vital forces is also highly important in prognosis. Every affection where their diminution is considerable is always very dangerous; their perversion is equally so.

Certain epi-phenomena appearing in the course of diseases, may be of some importance in prognosis; the *parotiditis* noticed in grave fevers and in typhus is particularly of this class. The development of the parotids in acute diseases, has been regarded as favorable by some and dangerous by others. *Hildenbrand* was led, from a great number of observations, to regard inflammation of the parotids, supervening at the decline of disease, as favorable, and that occurring at the commencement as unfavorable. In our opinion, the appearance of parotiditis in an acute disease has always a gravity which increases the anxiety the disease may already have inspired. At whatever stage of the disease this swelling occurs, it is allowed by all to be a bad omen when it attains to the degree of embarrassing deglutition, and above all, respiration.

The aspect of wounds and of surfaces to which blisters and rubefacients have been applied, supplies us also with prognostic signs. When wounds are of a bright color, and furnish thick and homogeneous pus, it is a favorable sign; the contrary is the case when they are brown, livid, black, dry, or pour out putrid or sanious matter. It is a very unfavorable, and nearly always a fatal, sign,* when blisters and sinapisms produce no effect upon

* It often happens that sinapisms and blisters produce no effect, even in patients who are not dangerously ill, on account of the bad quality of the materials employed. It is important to be on one's guard against the false inductions which might be drawn from their slight action.

the part to which they are applied. It is also a bad sign when the dermis peels off from the subjacent parts in places where leeches have been applied; we have constantly observed death to succeed this sign, seemingly of such slight importance.

Such are the principal signs by whose aid we are enabled to pronounce an opinion upon the changes which will supervene in the course of diseases. These signs, we repeat, are valueless, except by reason of the reciprocal support they yield one another. A single sign, however important in itself, has no weight except by the concurrence of many others. The most unfavorable sign, if isolated, as is seen in certain nervous affections, indicates no danger: convulsions, picking of the bedclothes, general insensibility, horror of liquids, meteorism, involuntary excretions, aphonia, etc., are signs of almost no importance in hysterical attacks, and almost always fatal in febrile affections. It is, then, only by a comparison of all the signs, that the physician can obtain a knowledge of future events. — M.

CHAPTER XVIII.

THE ALTERATIONS PRESENTED BY THE ORGANS AFTER DEATH.

THE numerous alterations caused by disease, in the structure of our organs, have of late years greatly attracted the attention of physicians, who have based upon them, at it were, a new science which they have named *Pathological Anatomy*, but which ought rather to be considered a branch of pathology. The history of diseases is necessarily incomplete, when considered independently of the structural alterations effected by them, and the study of these alterations is almost without interest when disconnected from the history of the disease.

We are surprised, with Senac,* that for so long a period physicians showed so little zeal in obtaining the light that necroscopy † would have furnished them; but it is still more astonishing that at the time when the anatomy of man in health was cultivated with most success, the lesions which disease had effected in his various organs should have scarcely attracted attention. *Fallopius*, *Vesalius* and *Eustachius*, who made such great advances in anatomy, and *Harvey*, who discovered the circulation of the blood, lived not far from a century before the first physicians who engaged in the study of pathological anatomy. The example of *Bartholin* and *Theophilus Bonet* was followed by but few, as *Morgagni*, *Lieutaud* and *Portal*, and it was not until the end of the last cen-

* *De reconditâ Febr. Naturâ*, pag. 194; “*Mirum est sanè eos qui de morbis scripserunt, non majori studio investigasse quid morte ipsâ edoceamur.*”

† *Nεκρoς*, dead body; *σκοπεω*, I examine.

tury that this branch of pathology was generally studied. Since then, all educated physicians take every opportunity to ascertain after death the nature of the lesion which caused or accompanied the phenomena observed during life; and many treatises and important memoirs have been published upon this subject by the most distinguished physicians of our age; among whom may be mentioned, *Bayle, Baillie, Laennec, Dupuytren*; and still later, *Breschet, Cruveilhier, Louis, Andral, Bouillaud, Rayer, Carswell, &c. &c.*

The advantages derived from the study of pathological anatomy are now so generally appreciated, that it is unnecessary to enumerate them. When we consider the numerous errors corrected by post-mortem examinations, the positive information they furnish respecting the seat of many diseases, and how important they always are in confirming or rectifying our diagnosis, it cannot be denied that these investigations have greatly conduced to the advance of our art, and must still continue to do so to an indefinite extent.

In order to discover and appreciate the lesion produced by disease, we must first have a clear idea of the conformation and structure of the organ in health. A knowledge therefore of normal, should precede the study of pathological anatomy.*

It is also necessary that he who devotes himself to these researches, should follow, in his investigations, some convenient method, that nothing essential be omitted, and that the examination of parts first exposed may not interfere with that of others.

Lastly, it is very useful, if not indispensable, to have a previous knowledge, from accurate descriptions, or rather from actual observation, of the various alterations to which the organs are liable.

ARTICLE FIRST.

Mode of Conducting Post-mortem Examinations.

THE terms "post-mortem examination," "autopsy,"† and "necropsy,"‡ are synonymous, and express both the operation by which the internal organs of a dead body are exposed to view, and the record of the appearances exhibited by them.

§ I. We should always begin the examination of a dead body by observing its external aspect: the degree of fleshiness or emaciation should be noted with as great precision as possible. The general or partial tumescence produced by air or serum should also be carefully ascertained. It is sometimes necessary, particularly in examinations made for judicial purposes, to observe with great attention the atti-

* It is desirable that the varieties of form, color, consistence, &c. which the organs may present in health should be better determined and more accurately described than they have been, hitherto, in order that we may distinguish with more precision what is caused by disease, and what is only a variety of the healthy state.

† *Αὐτοψία*; from *αὐτος*, himself; and *οὐτομαι*, I see.

‡ *Νεκρός*, dead body; *οὐτομαι*, I see.

tude of the corpse and its relation to surrounding objects, the state of the clothes, &c. &c. Circumstances, apparently very trifling, may become important in the further development of facts. The expression of the countenance, which is often that of fear, despair, &c., ought not to be neglected. The flaccidity or rigidity of the limbs should be particularly noted; the rigidity always commences with the jaws, the neck, the trunk, afterwards extending to the upper extremities, and lastly to the lower; it generally comes on as soon as the animal heat has passed off; in those who have died of an acute disease, it is greater and more durable than in those who have died of a chronic affection; wounds, contusions, ecchymoses, excoriations, marks of ligatures, eruptions, tumors, ulcerations, gangrene of the integuments, are circumstances which should always be noted. Attention should also be given to the reddish and livid spots caused by the stagnation of the blood in the subcutaneous cellular tissue, and sometimes in the skin itself; these are generally found on the posterior part of the trunk when the body has lain upon the back since death; they may exist, however, even upon parts of the body which have not been dependent; but in such cases they are almost exclusively found in the neighborhood of large veins, and seem to be caused by an exudation from them. Sometimes these spots are diversified with lines, furrows and marks, in which the skin still remains white; these are caused by the folds of clothing, or by inequalities on the surface upon which the body lies. An elevated temperature and fluidity of the blood are conditions which favor the formation of these spots. They are more particularly observed in persons who have died of certain affections, as severe fevers, gangrenous diseases, variola, scarlatina, &c. &c. Under the same influences the epidermis can often be detached from large surfaces by the slightest friction. It is important, especially in examinations for legal purposes, not to mistake post-mortem lividity for ecchymoses, which, as we have already shown, are symptoms, and are caused by effused or infiltrated blood. The color of the latter varies according to the time elapsed since the contusion, and with the degree to which the reabsorption of the blood has proceeded; the livid spots formed after death are, on the contrary, simply owing to a stagnation of the blood in the tissues. Marks of putrefaction should also be observed; this generally exhibits itself first upon the abdomen and towards the iliac fossæ, in greenish spots, and the body exhales a peculiarly fetid odor.

§ II. Having examined the exterior of the body with sufficient attention, we proceed to inspect the internal organs.*

Most physicians commence the examination with the organ of which there is supposed to be a lesion; this method is not objectionable if, after having found the suspected lesion, we proceed with

* The instruments necessary in the examination of bodies are nearly the same with those employed in dissections, viz. scalpels, knives, blunt-pointed scissors of different sizes, an enterotome, a rachitome, several probes, a saw, and a hammer; a glass tube is sometimes useful for inflating organs, in order to render certain lesions more apparent.

the examination in order to ascertain whether any other exists; but as this latter is often neglected, it is better to make it a rule to open those cavities, first, where no lesion is suspected.

Where there is no reason for preference, the abdomen should be opened before the chest, and the latter before the head, because by commencing with the abdomen, if it contain fluid, the quantity and nature of the latter can be more readily ascertained, and if there be any fluid in the thorax it is prevented from escaping, and the depression of the diaphragm caused by it can be readily detected. In commencing, however, with the thorax, unless care is taken, there is danger of slitting down the diaphragm, and causing a communication between the pleura and peritoneum; besides, if a liquid fills either of the cavities, a portion of it is liable to escape into the other, and if it exists in both, mixture may ensue, and in either case, error or great uncertainty results. When the abdomen is opened, it is more convenient to extend the incision upwards and open the thorax, than to pass to the examination of the head and return to the chest, more particularly as after opening the head, we are often obliged to return to the trunk to examine the spinal marrow.

The three great cavities are opened in the following manner. To lay bare the abdominal viscera, a semicircular incision should be made, commencing at one of the hypochondria, descending towards the pubis, skirting the anterior and superior spines of the ilia, and terminating at the other hypochondrium, making a large flap including all the anterior wall of the abdomen. When this flap is turned up upon the thorax, the incisions may be prolonged to the articulation of the clavicles with the sternum, when the chest is to be opened by dividing the cartilages of the ribs; but when the latter are to be sawed through, or, what is better, divided by a costotome, the incision should be carried further outward. When the ribs and clavicle are divided, or the cartilages cut through and the sternum disarticulated, this bone should be removed from the mediastinum by means of a scalpel, turning it upwards towards the head, and, lastly, should be entirely detached together with the flap. In some cases, in order to more fully expose the diseased organs, it is necessary to dislocate, or to break the ribs near their posterior extremity.

In opening the head, we commence by incising the integuments circularly, carrying the incision a half inch above the eyebrows and towards the superior occipital protuberance, or a little above it.* This incision should be carried completely through the integ-

* A more simple, and certainly much less objectionable method of performing this operation, and one which we have usually seen practised, is that in which an incision is made, extending from one ear to the other, over the summit of the head, the edge of the knife being turned upwards so as to cut from within outwards; the flaps are then dissected back far enough to permit a horizontal sweep of the saw, in a direction nearly corresponding to that recommended, by the author, for the first incision. We thus avoid the unsightly wound which must follow both the methods proposed above. — TRANS.

uments, and the way for the saw carefully prepared. A crucial incision may also be used, extending it from the root of the nose to the occiput, and from one ear to the other, passing over the crown; the four flaps thus found, are then to be turned back. Having incised the integuments, we should use the saw to divide the bone when a lesion of either it or the pericranium is suspected; in other cases, a hatchet or hammer made for the purpose, with a sharp edge, is more convenient. This instrument, it is true, jars the head very much, but it does not tear the dura mater or cerebral substance, as the saw is liable to do; besides which, it occupies less time than the latter. When the bone is cut through all around, a hammer or chisel may be inserted into the anterior part of the division so as to pry it open; the fingers, well protected by a towel, can then be introduced and the calvaria torn off, leaving the dura mater exposed.

B. In the succeeding examination of the parts thus uncovered, attention should first be given to the external condition of the viscera, their color, form, size and consistence, their relations and accidental adhesions, and to the fluids in the visceral cavities. They may be then pushed aside to enable us to examine the parts beneath, and turned over in order to expose their other surfaces, and the membranes which enclose them cut through, &c.

Having observed with sufficient attention the exterior conformation of the viscera, we should proceed to examine any internal lesions they may present. The method of examining the *hollow* organs, differs from that employed in the examination of others. The first, and particularly the organs of respiration and digestion, ought to be carefully incised as soon as possible, and the fluids they contain examined, and, if necessary, collected. The *solid* organs, as the liver, spleen, brain and kidneys, should be incised in different directions, and sometimes cut into thin slices, *or shavings*,—*assulatim*, as Morgagni expresses it; the ducts should be slit open and their lining membrane examined, as well as the fluids contained in them. A very delicate dissection is sometimes necessary in order to appreciate lesions, and no pains should be spared to examine them thoroughly, for one autopsy badly made, does more harm than good. It is particularly in lesions of the nerves, aneurismal tumors, considerable alterations of the structure of certain viscera, and chronic inflammations of the serous membranes with adhesions of the viscera, that a minute examination is often indispensable.

It is often useful to inject the ducts and vessels of some organs with a colored and coagulable fluid, whenever it is desirable to know their new relations, their size, or the obliteration or development of a collateral circulation. This process may also be resorted to in cases of death from hæmorrhage, in order to ascertain whether the blood escaped from a small artery, ruptured or ulcerated, or by simple exhalation; as, for example, in the hæmoptysis of tubercular subjects.

C. Such is the general method of procedure in the examination of the different viscera; in making a further inspection of them, the following method, which differs from that recommended in their exposition, is to be preferred.

We should commence with the organs of circulation, examining first the pericardium, the heart and the large vessels which leave or empty into it. The heart is to be incised longitudinally, its color, its consistence, the thickness of the walls, from the base to the apex, should be noted. According to Bizot's researches, the thickness of the walls and the entire volume of the heart augment progressively from infancy to old age. This fact is an indispensable element in our means of appreciating hypertrophy at different stages of life.* The fore finger should be passed into the different orifices of the heart to ascertain whether they are free. If they are not, they should be exposed to view by an incision, in order to discover, if possible, the degree and cause of the retraction. Before however doing this, we should ascertain, by pouring water into the ventricle or artery, as the case may be, whether there is inefficiency of the valves, that is, whether they be so affected as to permit the blood-vessels to regurgitate through them. The larger blood-vessels of the chest should always be opened, and sometimes those in the neighborhood. They are generally found filled to some extent with fluid and clotted blood, their walls presenting, in such cases, the effect only of imbibition, a red color which grows brighter upon exposure to the air.

We pass next to the organs of respiration. Before taking the lungs from the chest, we should examine whether they present marks of vesicular or interlobular emphysema; squeeze them in order to ascertain whether they are soft and elastic as in the healthy state; and incise them in different directions to ascertain their structure.†

When tuberculous excavations or purulent cavities exist, we

* Bizot has furnished in his paper, exact dimensions of the walls and cavities of the heart in the two sexes, and at different ages.

† The lungs present, upon examination after death, a phenomenon which was long since observed, but not correctly explained. Their most dependent parts are filled with fluid, making them darker and heavier than the others. It has been supposed that this engorgement takes place immediately after death, and that consequently we can tell in what position the body was placed at that moment. Bayle, doubting the correctness of this opinion, made some experiments to ascertain the fact. He recommended that persons dying upon their backs should be immediately laid upon the belly, and so left until opening the body. He also noted the position in which each patient lay during his last moments. The result of these examinations was, that the engorgement of the lung always occurred in the part dependent *just before* death; that is, in the back in the greater number, at the side in those who died upon the side, and at the base, in those who had retained the sitting posture during the last hours of their life. Placing the corpse upon the belly, produced no engorgement in the anterior part of the lung. These experiments are not only interesting in legal medicine, but are of the highest importance to the physiologist, for they concur in demonstrating the influence of physical laws upon man in disease; an influence which becomes the more marked as the vital powers diminish.

should examine whether they communicate with the pleura or with the bronchia; whether they are in the pulmonary parenchyma, or in that portion of the pleura which dips between the lobes of the lungs (interlobular abscess). The communication of these cavities with the bronchia, may be most readily ascertained by inflating the lungs through the trachea by means of a glass tube; if the abscess have existed in the pleura, the cavity of the chest should be filled with fluid, into which the bubbles of air will escape, and thus demonstrate the communication. In some cases, however, they can be discovered by a simple inspection of the parts, or by slitting open the bronchia by means of a director and bistoury or probe-pointed scissors. In examining the trachea and bronchia, they should be slit open throughout their whole extent, in order to judge of the modifications they may present as to their dimensions (dilatation, contraction, obliteration), the color, consistence and thickness of the parts which constitute them, and of the secretions they contain. To see the larynx conveniently, the base of the tongue must be separated from the inferior maxillary bone by a semi-elliptical incision along the concave surface of this bone, and prolonged at each end to the side of the neck. A second incision should detach the volume of the palate and the posterior walls of the pharynx; then drawing out the tongue and larynx, the œsophagus and trachea should be cut off low down in the neck. Having separated the mass, the pharynx and superior part of the œsophagus are first to be opened, next passing to the examination of the larynx, particularly its superior entrance and the glottis, looking through the latter to ascertain its size, and then slitting it open to inspect the mucous membrane and cartilages.

Before opening the larynx, the state of the pharynx should be ascertained, and if considered desirable the œsophagus may be slit down throughout the whole extent, after examining the organs of respiration and circulation. The stomach and alimentary canal can then be opened with blunt-pointed scissors, or, what is better, Cloquet's enterotome. This is important to ascertain the color of the mucous membrane, whether it is injected, and if the injection is uniform, or in patches, arborescences, or dots. The consistence may be ascertained by detaching it in strips, which in health vary in length according to the place whence they are torn. At the greater cul de sac of the stomach they are three or four lines in length; at the greater curvature, six or eight; an inch, inch and a half, and sometimes two inches at the lesser curvature, and about the pylorus and in the smaller intestine, from five to ten lines.

The thickness of the mucous membrane and the state of the subjacent tissues should be attended to; a careful examination should also be made of Brumer's and Peyer's glands, which present characteristic alterations in typhoid fever, and partake of the tubercular degeneration in those who die of phthisis. In ascertaining the state of the mesenteric glands, their relation with the intestine should be preserved, to enable us to determine if the lesions respecting them correspond to those of the folds of the intestines.

The liver, gall-bladder, biliary ducts, spleen, pancreas, blood-vessels and lymphatics, where these exist, are to be taken up successively, afterwards the urinary organs, beginning with the kidneys and ureters, and ending with the bladder and urethra; closing the examination of the abdominal viscera, by that of the organs of generation.

The brain and its appendages require great attention. The dura mater should never be incised before finishing the inspection of the thoracic and abdominal cavities; it supports the brain, and prevents its tearing. It is even preferable not to open the cranial cavity before finishing the examination of the chest and abdomen. The dura mater should be divided with the scissors, or scalpel, on each side of the falx, which should then be cut across near its attachment to the crista galli and turned backwards, whilst the dura mater thus freed may be pushed outwards from off the hemispheres. Before going further, the cerebral convolutions must be examined, to ascertain whether they are as prominent as they should be, and equally so on both sides. When the flattening is limited to one hemisphere we ought to find a severe lesion, as hæmorrhage, or softening; when it exists in both, and the membranes are not inflamed, it is owing either to an accumulation of serum in the ventricles, or to a hypertrophy of the brain, as has often been noticed in persons dying of cerebral affections produced by lead. In opening the dura mater, notice should be taken of the quantity of fluid contained in it, and in detaching the other membranes, their strength as well as the degree of adhesion to the cerebral substance, should be ascertained. It is generally better to examine the brain *in situ*, a rule which is applicable to almost all the viscera. It should be cut in thin slices, especially, when approaching the lateral ventricles, which should be opened very carefully, when the brain is sliced off level with the corpus callosum, by plunging the point of a scalpel vertically into the cerebral substance, three or four lines from the median line, and a little nearer the anterior than the posterior surface of the brain. Those cavities should be opened throughout their whole extent; the fornix must be turned back after dividing it in the middle so as to display the third ventricle. The remainder of the brain is to be cut into slices as far as the tuber annulare. The tentorium is then to be separated from the edge of the temporal bone to which it adheres, and, carrying the point of the scalpel far down into the spinal canal, the marrow is to be divided, and the cerebellum removed. After taking this organ from the skull, it is to be turned over, the fourth ventricle may be examined, and then cut into slices to ascertain whether its substance is healthy. The examination of the cranium is finished by noting the vessels that ramify over the inferior wall of its cavity, not forgetting to open the sinuses which are sometimes inflamed or obliterated.

The length and difficulty of the preparations necessary for laying bare the spinal marrow without injuring its tissue, are the chief reasons why its examination is so often neglected. It is desirable,

in most cases, however, that it should be carefully made, and if done with perseverance and discernment it would doubtless lead to interesting results.

Many instruments have been devised for the double object of saving trouble, and preventing injury to this organ and its membranes. For the chisel and mallet, which were originally used, a knife, first simple, then double, with a convex edge, was substituted. To this was next added lateral guards to prevent its penetrating too deep when driven by a hammer. A saw, single, or double, with a convex edge, so as to cut the processes either on one or on both sides simultaneously, was next proposed, and, lastly, Magendie has of late employed large scissors, the cutting extremity of which is very short and curved, so as to pass readily into the canal whilst the other extremity being long, forms a powerful lever with which the bony tissue can be easily severed. These various instruments are called *rachitomes*.

There are certain diseases in which we ought to examine the limbs, as in wounds, fractures, abscess, ulcers, caries, rheumatism, contraction, dislocation, phlebitis, &c. This examination requires no special rules.

Such is the most convenient method of making post-mortem examinations: * it can and ought to be modified by circumstances, a detail of which would be here out of place.

ARTICLE SECOND.

The principal Lesions presented by the Organs after Death.

WE shall now proceed briefly to consider the chief lesions which organs present after death. We shall class them in three principal series, viz. 1st, lesions of solids; 2d, alterations in the fluids; 3d, the presence of foreign bodies, either living or inanimate.

1st Series. *Lesions of Solids*.—On account of the multitude of subjects which these comprise, they will be divided into three sections; lesions of structure, lesions of conformation, and lesions of relation.

§ 1. *Lesions of Structure*.—Among the lesions of structure,

* The reader may be surprised at our advising in one place to open the abdomen first, and in another to examine the thoracic, before the abdominal viscera. We have already stated why the abdomen should be first opened, and the following are our reasons for first examining the thoracic organs. We cannot judge well of the volume and distention of the heart, except when the large vessels that arise from, and empty into it, are intact. If we commence by inspecting the abdomen, and divide the liver, the vena porta, and the inferior cava, the heart will collapse before we examine it. For the same reason we should not pass to the lungs before examining the heart. The œsophagus, which constitutes part of the digestive apparatus, cannot be examined until after the heart and lungs, behind which it is situated, be removed, which is another reason for following the rule we have laid down.

we place inflammations, ulcers, fistulæ, gangrene, tubercles, cancer, melanosis, softening, induration, and organic transformations.

A. *Inflammation* does not uniformly present after death, the same characteristics in the different tissues in which it is situated, so that, in some cases, it is even more difficult to point out its effects in the dead body, than to specify the symptoms which indicated its existence in the living. In all cases, when, upon opening the body, a part is found more voluminous, redder and more easily torn, than in the healthy state, we have reason to believe that it has been the seat of inflammation: the presence of pus, either collected or disseminated through an organ; albuminous, granulated membranous or tubulated concretions, are sure signs of inflammation. It does not, however, always show itself in so marked a manner, and the phenomena which characterize it must be studied in each tissue.

In the mucous membranes, even the deepest redness is insufficient to characterize inflammation; * in order to this, in addition to the red color, there must be an alteration of consistence, a thickening, ulcerations, or a creamy, purulent, or brownish exudation: in fact, when death supervenes very speedily after the inception of inflammation, the only traces of the latter, in many cases, are an injection in fine points or in patches, and readily mistaken for passive or post-mortem injections. The latter, however, take place in dependent parts, being often noticed in the folds of the intestines which dip down into the pelvis; they are accompanied by an injection of the veins, and the redness they produce often disappear by washing or a short maceration, whilst the redness of inflammation is persistent. The same test has been used to distinguish the effect of inflammation on the blood-vessels from the redness of imbibition.

In the serous membranes, where inflammation neither produces redness nor tumefaction, the presence of a purulent liquid, of false membranes or adhesions, are characteristics which do not permit us to doubt its existence, provided these signs are constant. But these are not always necessary; and especially in cerebral inflammations, in which a slight alteration in the smoothness of the serous surfaces, a pliability somewhat increased, a trifling infiltration of the cellular membrane which unites the arachnoid to the cerebral substance, are considered by most physicians as signs sufficient to indicate inflammation of this membrane. Lastly, in some cases, the simple dryness of serous membranes in those who die suddenly, would make an inflammation of short duration, the effect of which has been to suspend the normal secretion. This

* In persons who die of aneurism of the heart, the mucous membrane of the digestive apparatus usually presents a blackish red color. We cannot however allow that aneurism of the heart is always accompanied by inflammation of the mucous membrane of the stomach. This livid redness is also found in the cheeks, lips, hands, without there being any other indication of inflammation.

opinion, first put forth by *Marandel*, has always appeared to us hazardous, and the facts observed in the epidemic Asiatic cholera * which ravaged Europe, give increased weight to the doubts which we have always expressed respecting the value of this anatomical condition.

In the cellular or laminous tissue, inflammation shows itself with very marked characteristics; as redness, swelling, hardness, and, at a certain period, the presence of pus infiltrated between the layers of the tissue or collected in a cavity. It is nearly the same with the lungs where it occurs under various forms, but with characteristics generally very distinct and easily perceived.†

This is not however the case with the brain, liver, spleen, kidneys or uterus, particularly in women who die a few hours after confinement. In all these organs, if we except those cases where pus exists in the parenchyma, the anatomical signs of inflammation are rather obscure, so that what one would consider indicative of it, another would regard as a disease of a totally different nature, while a third would look upon it only as a variety of the normal condition.‡

B. Post-mortem examinations often reveal, in the interior of organs, ulcers, the existence of which may sometimes be recognized or suspected during life, but whose anatomical disposition can only be studied after death. These ulcers are sometimes primary or simple, that is, they are accompanied by no other alteration of the part they occupy. But in most cases internal ulcers are the consequence of the softening of tubercles, or cancer; or, of the separation of an eschar, or of a specific inflammation, as syphilis. An internal syphilitic ulcer presents characters analogous to those of an internal one in the living subject; ulcers from gangrene or from tubercles, generally present in some portions of

*In a great number of those who die of cholera, the serous membranes presented a remarkable dryness.

† Inflammation of the lungs exhibits itself in five different stages. 1st. The "*engorgement*" of *Bayle* or the "*first degree*" of *Laennec*, in which the lung is heavier, more pliable than in the normal state, and of a red or violet color; it still crepitates, but less than in health. If incised, it appears gorged with a frothy and dirty bloody serum. 2d. *Red hepatization or carnification*, in which the lung is easily torn, compact, granulated, red, heavier than water and contains no air. 3d. *Gray hepatization*, in which the lung is as heavy as in the last, does not crepitate, but tears still more readily, and is permeated with a gray or reddish purulent fluid. 4th. In some cases the lung presents all the characters of red hepatization, except the hardness. In this state it is heavy, contains no air, and soft like the spleen; this is *splenization*. 5th. The pulmonary tissue is susceptible of a *gray induration* without the exhalation of pus into its parenchyma; in this state, which seems to depend upon a chronic inflammation, it is not shining and translucent as in cancer, and no puriform liquid escapes from it when torn, as in hepatization.

‡ Softening of the cerebral pulp, cirrhosis, the granular disease of Bright, and the engorgement of the spleen following intermittent fevers, are considered as inflammations by some, and special alterations by others. In the numberless modifications in color and consistence of the liver, who can exactly make the bounds between the normal and diseased state?

their surface sloughs or tubercles, which indicate their nature ; in cases of cancer, an incision of the part will at once disclose the kind of lesion to which the ulcer belongs.

The existence, in the small intestines, of ulcers more or less numerous, furnishes a very important anatomical character ; of all acute diseases, typhoid fever is that alone in which this is an almost constant lesion, and among chronic diseases, tubercular affections are those in which it is almost exclusively noticed. In the severest dysentery, whilst the large intestines are riddled with ulcerations, the small intestines are generally exempt. On this account, whenever numerous ulcerations are found in the small intestines, we should look for the other lesions that ought to accompany them ; for tubercle, if the patient have died of a chronic disease ; for typhoid alterations, if he have died of an acute one.

C. We said something of fistula whilst speaking of the symptoms furnished by the internal appearances of the body ; we will only add here, that they can only be thoroughly studied by comparison of the functional disorders that they produce during life, and the lesions which are presented after death. It is thus only that we can accurately ascertain their direction, orifices, the peculiarities of the structure of the canal, and, sometimes, even the causes which have kept them open.

D. Gangrene, which consists in the death of some part of the economy, is generally indicated by very marked signs which nevertheless have still been confounded, in post-mortem examinations, with black discoloration ; thus there is often some question as to gangrene of the plenra, peritoneum and liver, diseases of very rare occurrence. The black color may exist without gangrene, and the latter may exist independently of the other. The eschars of the mucous membrane are often of a grayish or whitish color ; those produced by nitric acid are yellow ; *Quesnay* states that, in one case, he saw the gangrened parts exhibit a remarkable transparency. The black color cannot therefore be considered as characteristic of gangrene. Its principal characters are ; 1st. complete disorganization of the gangrened part, in which the elementary tissues can no longer be distinguished ; 2d. softness and flaccidity ; 3d. the fetid and characteristic odor which it exhales ; and 4th. the sanies, ichor, and fetid gas which escape from it. In that variety of gangrene termed *dry*, the part presents a black color, a hardness sometimes like that of wood, and always a complete disorganization of the tissue. Modern surgeons and particularly *Richerand*, consider necrosis as a gangrene of the bone.

E. Tubercles exist almost always in large numbers. They attack principally the lymphatic glands, the viscera lined internally with mucous membrane, and more especially the respiratory organs. They are generally developed in the tissue of parts, which they, finally, completely pervade. In some cases, they are enveloped in

a membrane (*encysted tubercles*). Their size varies from that of a millet seed to that of an orange or even of a man's fist. Their aspect and anatomical characters differ according as they are in a state of crudity, softening, ulceration, or cicatrization, so that unless they have been traced through the intermediate stages, what are but successive phases of the same affection might be taken for a disease essentially different. Crude tubercle is formed of a whitish, yellowish, or grayish opaque and solid substance, without cohesion, resembling soft cheese, and in which no vessels or other appearance of organization can be distinguished.*

In softened tubercle, the substance has lost its consistence; it is liquid, at least partly so, and resembling pus, or milk mixed with white, opaque, cheese-like particles. It has been long supposed, that this softening takes place from the centre towards the circumference; but the ingenious researches of Mr. Lombard, of Geneva, have led to a different conclusion. New observations are required before we can decide upon this point. Subcutaneous tubercle opens exteriorly by one or more openings often fistulous; internal tubercle when ulcerated, opens into the nearest mucous canal, and soon exhibits sometimes a flattened ulcer, in which some particles of unsoftened tuberculous matter, (tuberculous ulcer of the intestines, larynx, &c.) and sometimes, as in the pulmonary parenchyma, a cavity of greater or less size, often irregular and sinuous, in which a purulent matter is alone discoverable. In some cases, there only exists in the place of these excavations a sort of fibro-cartilaginous mass, near which the surface of the lung is shrivelled, and which presents in its centre traces of a cavity with which one or more of the bronchi communicate.

The chalky concretions which are frequently met with at the summit of the lungs, especially in old persons, are attributed to tubercular disease, being considered as a transformation of the tubercle, and one of the modes of a favorable termination of the affection. This proposition, which has numerous partisans, and which is not without plausibility, does not yet appear to us sufficiently demonstrated.

F. Granulations are small globular bodies, transparent, smooth, elastic, sometimes marked by lines or black points, and somewhat analogous to cartilage in appearance. This lesion, which has been particularly described by Bayle, has been considered by Laennec as the first degree or rudimentary state of tubercle, and this last opinion, adopted by most writers of the present day, is now generally admitted to be correct. We do not, however, submit to the general conviction. We acknowledge that where the lung is pervaded by granulations it is not unusual to detect, in the centre of some of them, a small point of opaque matter analogous to tuber-

* Chemical analysis gives 96 15 parts of animal matter, and some hundredths of hydrochlorate of soda, of phosphate and carbonate of lime, with a slight trace of oxide of iron.

cle; we acknowledge also that, generally, tubercles and granulations are found in the same subject; but we do not think these circumstances sufficient to demonstrate with certainty the connection between the two affections, any more than we should conclude, from the tubercular matter in cancerous masses of the liver, that cancer and tubercle are two alterations of the same nature.*

G. Cancer exhibits itself under the different forms of schirrus, encephaloid disease, and cancerous ulceration. The characteristics common to these lesions are indefinite increase, whatever be their form (degeneration, or ulceration); an almost constant reproduction after excision or destruction; a complete incurability when abandoned to themselves, their general phenomena being progressive wasting; and alteration in the color of the skin, more particularly of that of the face, which assumes a straw or sodden yellow.

Schirrus consists of a hard, grayish, or bluish white tissue, making a peculiar noise when cut. This tissue is not completely homogeneous, but there may be distinguished in it a texture formed of fibrous laminæ, in which is contained a matter resembling, in color and consistence, the skin of bacon. In other cases, these laminæ are arranged in radii, the cut surface of the cancer presenting an appearance analogous to that of a turnip; it is this form that some writers have termed *napiform*. By compressing the schirrus, we can generally force out a transparent, albuminous fluid, which some persons have designated under the name of cancerous fluid. The injections made by Scarpa have led to the conclusion that schirrus does not contain arteries or veins, or at least only a few ramusculi.

Encephaloid or cerebriform cancer is an accidental production, or organic degeneration of a milky white color, slightly tinted with pink, exhibiting often the color and consistence of cerebral pulp, and sometimes pervaded by effused blood collected in cavities of greater or less size. M. Berard has demonstrated by injections and dissections † that, on the one hand, the encephaloid tissue is penetrated by a great number of arterial vessels, the number and size of which increase as the softening becomes more considerable; and, on the other, that there are no permeable veins in the centre of encephaloid masses, whilst the periphery of these tumors consist of a highly developed venous network. This development of the arteries and atrophy of the veins satisfactorily explain the hæmorrhages, to which parts affected with this kind of cancer are subject.

Encephaloid matter, like tubercle, attacks all organs; the bones themselves are very frequently affected. It sometimes exists in a state of infiltration, but is most often found in layers or smaller masses, and, sometimes, encysted. In some organs, as the lungs, and more especially the liver, this matter is deposited in roundish

* See our article "Granulations" in the Dictionnaire de Médecine of 21 vols. vol. x.

† Dictionnaire de Méd. in 21 vols., Art. Cancer.

masses, of the size of a filbert, walnut, or a hen's egg, which seem to be developed in the interstices of the parenchyma, which they separate and compress without affecting. They adhere but slightly to the neighboring part and are easily enucleated. The soft vegetations which are developed upon some points of the mucous membranes are generally encephaloid cancer.

Cancer shows itself upon the lips and the *os tincae*, particularly under the form of a simple ulceration, without the existence of schirhus or encephaloid matter beneath it, and which nevertheless resembles cancer in the firmness which is felt in it when pressed by the finger, and in the lancinating pain and general phenomena which accompany it. This is a form of cancer which commences where the others finish, and in which the *ulceration* seems to destroy the cancerous tissue as soon as it is formed.

There is an affection characterized by the development of a whitish transparent matter resembling calf's foot jelly, which has been considered a species of cancer, and to which the term *colloid* or *gelatiniform* has been applied. It is most often found in the ovaries. This morbid production appears to us to be a development *sui generis*, and to be too distinct from schirrus, encephaloid or ulcerated cancer, to be confounded with them under the same name.

H. Melanosis* is an alteration of tissue which some authors have considered as a variety of *cancer*, and to which they have applied the term *melanotic*. It shows itself in rounded or irregular masses, of firm consistence, of a black, purple or bluish color, and size varying from that of a pea to that of the fist, and presenting, in its consistence, form and color, some resemblance to a truffle. Some physicians have thought that the melanotic tissue is capable of being softened and ulcerating (Bayle and Laennec), but there is no agreement upon this point. This is, in our opinion, melanosis, properly so called, and that to which the name ought alone to be given. It should not be confounded with the black color often presented by the glands surrounding the roots of the lungs and larger divisions of the bronchia, possibly produced solely by age. Nor do we, with MM. Breschet and Casenave, consider the blackish and pitchy matter which is met with, or the surface of mucous membranes, thrown off in melaena, and more rarely excreted with the urine, as a variety of melanosis (*liquid melanosis*). In our opinion, although chemical analysis may demonstrate the existence of similar elements† in melanotic masses and in the black liquids which have been associated with melanosis, although there may be between them as great an analogy as between cancer and the sanies which flows from its ulcerated surface, we think that a complete degeneration of tissues and a morbid secretion should not be confounded under a common name, especially when observation exhibits, on the one hand, melanotic masses without any

* *Μελας*, black; *ροσος*, a disease.*

† Many chemists, particularly MM. Thenard, Barruel and Lassaigne, have detected in melanosis, as in the black matter thrown from the stomach, most of the elements of the blood.

traces of liquid melanosis, and on the other, the so called liquid melanosis, without the existence of the former; the secretion of black matters, never in fact proceeds from a melanotic degeneration, but is generally produced by cancerous ulceration.

The other alterations of structure, of which we are now about to speak, have this in common; that they all resemble some one of the tissues of the animal economy in a healthy state. On this account they are called, in general, *transformations*, each being designated by a particular epithet. The principal of these are the *cutaneous, mucous, serous, fatty, fibrous, bony, cartilaginous and horny*.

I. *The cutaneous transformation* is often observed in mucous membranes, where, in consequence of a prolapsus of the organs which they invest, they become, as it were, external organs. This takes place in prolapsus of the vagina, of the uterus and rectum.

J. The like is observed in the *mucous transformation* which is met with in fistulous tubes communicating with a cavity lined by mucous membrane. The cellular tissue changes progressively its nature, and takes the character, throughout the whole length of the fistula of a mucous membrane, in which, however, there are no villi or follicles.

K. *Serous transformation* is one of the most frequent. It occurs in almost every instance where a foreign body remains for a long time in any part of the animal economy, particularly in the cellular tissue, the organization of which peculiarly resembles that of the serous membranes. An accidental serous membrane, constituting, like all serous membranes, a sac without an opening, may be found around collections of pus; apoplectic clots, heads of dislocated bones and foreign bodies, such as missiles engaged in the tissues; it is also an accidental serous tissue, to which the hydatids attach themselves in the disease, known by the name of ovarian dropsy.

L. *Fatty transformation* has been observed in various organs, as the heart, muscles, mammæ and pancreas. It is very frequent in the liver, where it can be recognised by the whitish appearance, unctuous feel and fatty streaks displayed by incising it, and still more by the grease spot which it gives to paper when exposed to the action of heat. Authors are not agreed as to the manner in which the transformation is effected; some, among whom is Andral, think it is produced by a too profuse secretion of fat in the tissue which ordinarily secretes it, whilst the neighboring parts are compressed and atrophied without undergoing transformation, properly so called. Others, on the contrary, suppose that the tissue itself of the organs undergoes an alteration, and becomes changed into fat; fatty degeneration of the liver, which in health contains no adipose cells, may be adduced in support of the latter opinion.

M. *Fibrous* degeneration generally occurs in certain cysts, in various tumors, and more particularly in those of the ovaries.

N. *Ossification* is an alteration which frequently occurs in old persons, but which has been also sometimes observed before adult age. It is met with in the valves of the heart, in the arteries, muscles, serous membranes, cysts, ligaments and cartilages. *Petrifications* have often been confounded with ossifications, properly so called. Morgagni pointed out the laminated or fibrous tissue of the bone, as the most proper means for distinguishing those lesions. Chemical analysis furnishes a more ready and sure means of diagnosis; the osseous tissue consisting essentially of phosphate of lime and gelatine, whilst petrifications may present a totally different composition.

O. *Cartilaginous* degeneration is generally but the first degree of the osseous.

P. The *corneous* transformation has only been observed in the skin.

§ II. We shall include in this section, all the modifications presented by the external aspect of organs, as we have, in the first, considered all those presented by their internal organization.

With these modifications, are connected those of form, volume and color. We shall confine ourselves to their enumeration.

A. Among alterations of *form* may be mentioned: 1. Solution of continuity in the hard or soft parts (from wounds, ruptures from internal or external causes, fractures, separation of the cartilages and epiphyses). 2. Vices of conformation which sometimes can only be suspected during life, and which can almost always be better appreciated after death. 3. Excrescences of all kinds which are developed either upon the skin or the mucous membranes, vesicular or hard polypi, bridles, &c. 4. Knots and other inequalities which the surface of the viscera often presents, as in cirrhosis or in cancer of the liver, nodes in syphilis. 5. Flattening of the inequalities peculiar to certain organs, to the brain for instance.

B. Under alterations of *volume*, may be mentioned: 1. Distension of the hollow viscera, and the approximation of their walls. 2. The enlargement or retraction of tubes in general, and of their orifices in particular. 3. The augmentation or diminution of some of the solid organs, as the brain and muscles.

C. Among alterations of *color*, we class the livid rubefaction of all the tissues in the bodies of those who have died asphyxiated; the yellow color in jaundice, the red or blackish spots in scurvy and certain cases of poisoning, the non-inflammatory redness of

mucous membranes, that of the choroid membrane of the iris and of the internal tunics of the vessels, the pale or deepened color of the muscles, the black or pale yellow color of the liver, the mottled appearance of the spleen, &c. &c.

2d Series. *Alterations of the Fluids.*—Some of the alterations which the fluids undergo are appreciable during life, and have already been considered in the chapter devoted to symptoms. We will here only notice those alterations which are alone detected or made more apparent by necroscopy. We shall first briefly examine the alterations of the liquid, afterwards those of the gaseous fluids.

§ I. *Alterations of the Liquids.*—We shall first consider the liquids of the circulation, as the blood and lymph, and afterwards the exhaled or secreted fluids.

A. We have above (pp. 182 to 189) detailed the principal alterations exhibited by the blood during life, escaping externally, either in cases of hæmorrhage or by an artificial orifice in the arteries or veins. We have here but to discuss those which are revealed by post-mortem examinations.

The blood drawn from a vein at the commencement of typhoid fever generally presents no notable alteration, except a slight diminution in the consistence of the clot, a phenomenon by no means constant. But if the patient die at a period when venesection is no longer practicable, the blood is found sometimes fluid, but, more often, united in black clots, which are soft and friable, and consequently very different from the fibrinous and dense coagula which are found in the vessels, and particularly in the heart, of most of those who die of other acute diseases.

In some patients, who die with symptoms of purulent absorption, adherent or free clots filled with pus are found in the vessels and heart. In other cases, pus has been found collected in a single cavity in the centre of a clot, which becomes thus transformed, as it were, into an abscess.

There is another alteration of the blood which necroscopy can alone reveal. This is the presence of encephaloid matter in the veins near a cancerous mass. Velpeau, who published one of the first of several curious observations upon this subject,* supposes that the blood coagulating in the vessels becomes converted into encephaloid matter. It is the opinion of others, that in these cases cancerous matter is absorbed by the veins, and that by it the fibrine of the blood becomes altered. It is possible that the encephaloid matter developed either outside or within the walls of the veins, might penetrate them, and produce those vegetations which have been too readily attributed to a transformation of the blood.

B. The modifications to which lymph is subjected in the course

* *Revue Médicale*, 1825 and 1826.

of disease cannot be detected during life, but may be sometimes appreciated after death.

In women who die of puerperal fever, pus is frequently found in the lymphatic vessels of the uterus. We have seen, in a case of cancerous affection of the stomach and mesenteric glands, the lymphatic vessels of the mesentery distended with pus so as to make them much more distinct than could have been done by the most perfect injection. Since Cruikshank,* bile has frequently been found in the lymphatics of the liver. Sabatier,† Sæmmering‡ and many others have seen in the thoracic duct, a liquid resembling the blood in color and consistence, and have admitted that this fluid can pass directly into the lymphatic vessels. These observations, however, are far from conclusive, and it is, in our opinion, with reason that of late, Müller and Breschet§ have raised doubts as to the nature of the red fluid found in the lymphatic system.

C. The *mucous* membranes, which open externally by one or more orifices, sometimes permit a portion of the fluid which lubricates them, to escape by the mouth, anus, urethra or vagina, especially when the secretion is increased in quantity. But even, in these cases, it is not uninteresting to examine, after death, the mucus contained in the air and digestive passages, bladder and uterus. It is not unusual, also, to find, in some of the organs, collections of mucus, which have not been voided during life. The fluid should be examined after death, as during life, with regard to the alterations in quantity, consistence, color, and admixture with other substances caused by disease.

D. It is particularly for the study of the liquids enclosed in the *serous* membranes, that post-mortem examinations are indispensable, the disposition of these membranes preventing, during life, an examination of their contents. It is, in fact, only by the aid of rational signs that we can ascertain the presence, increase or diminution of fluid within their cavities, or whether they are lined with false membranes. It is true that sometimes by a special operation we can see, and subject to close examination, the fluids taken from the serous cavities. But such operations are rarely practised, and the whole fluid is never withdrawn; the denser portions subside to the dependent part of the cavity, and the membraniform concretions are generally adherent and cannot escape: an examination of the body can then alone give a correct knowledge of the morbid products contained in serous membranes. The fluids found in them may be colorless or watery, transparent, clouded or completely opaque, and may sometimes consist of pus or blood, pure or mixed with serum. With these liquids we often

* *Anat. des Vaisseaux Abs.* p. 8, trad. de Petit Radel.

† *Hist. de l'Acad. des Sciences*, année 1780.

‡ *De Mortis vas absorp.* p. 40.

§ *Système Lymphat.* p. 288.

find various concretions in the form of flakes, bridges or false membranes sometimes intimately blended with the sac, so as to give the appearance of an increased thickness of the walls; a close examination, however, will show, as Prof. Fouquier has demonstrated, that these may be detached, and that the thickness of the membranes is not increased. We may add that, in almost all cases, they preserve their natural transparency, and that the red or black color which they sometimes exhibit, belongs to the cellular tissue adherent to their surface; this is readily shown by careful dissection. The false membranes above mentioned, may be either simple or multiplied, soft or firm, presenting the greatest variety of color, from black to a grayish white. They assume, in a short time, often in a few hours, the appearance of organization. Andral* having injected some acetic acid into the pleura of a rabbit, found, at the expiration of nineteen hours, soft false membranes penetrated by numerous reddish lines, which anastomosed like blood-vessels. Cloquet even remarked the same thing in persons who had died of pleurisy, after a few days' sickness. Are these red lines vessels? This does not appear to us sufficiently demonstrated, and when we remember the *red lines* seen in other secretions, as in bronchial mucus and in the glairy matter thrown off by vomiting or stools, doubts may be entertained respecting the existence of these accidental vessels, which should become more apparent in old false membranes where they have never hitherto been clearly distinguished. On the other hand, in these false membranes are found blood and small tubercles, which would demonstrate a real organization, if it could be proved that the blood or the tubercles were produced by them, and not by the inflammation of the serous membrane; this, however, it is impossible to do. We may consider it as almost certain, that, in serous membranes entirely lined by them, morbid deposits, exhalation and absorption nevertheless continue; but do these deposits contain exhalents and absorbents, or do they merely constitute a permeable layer into which the mouths of these vessels open? In the present state of the science, these questions do not appear to us settled.

E. The liquids contained in the *synovial* membranes present alterations analogous to those of the serous. In addition to these, we sometimes find in them free or movable concretions, the presence of which during life has caused severe pains, these being more or less constant, according to the part of the articulation occupied by these foreign bodies.

F. The fluid contained in the *cellular tissue* is colorless or yellow, muddy or purulent, and, in some cases, mixed with blood. Examination after death reveals the presence of serum in the subcutaneous cellular tissue, in that between the muscles, in that in the interior of the body, as in the cellular tissue of the peritoneum,

* Clin. Medical, vol. iv, p. 538, 4th ed. Par. 1840.

and in the cellular appendages of the large intestines. Infiltration sometimes exists in the cellular tissue of the pleura, and in that which unites the pericardium to the exterior of the heart. Serum has sometimes been detected in the cellular tissue which unites the mucous membranes to the adjacent parts, both where it is external, accessible to view, and where it exists in deeper seated parts, as in the epiglottis-arytenoid folds, the glottis, and the valves of the intestines.

G. The fluids secreted by the glands present some alterations, but most of them are appreciable during life, except in the case of *retention* of these liquids, of the bile and urine, for instance, in their ducts and reservoirs. Post-mortem examination of the biliary and urinary passages sometimes reveals, in these cases, very interesting phenomena.

H. There is scarcely any cavity in which we may not find after death some effusion, circumscribed or diffused, of liquid or coagulated blood, of serous or thickened pus, with or without a membraniform envelope.

I. Fluids enclosed in accidental sacs or cysts are also found upon examination of bodies after death. These are sometimes aqueous; at others, viscid, resembling honey, gelatine, pus, lard; or they may be of a cretaceous character. In the first case, the cyst is thin and resembles the serous membranes; in the others, it generally has some thickness; it is often fibrous, and sometimes is even cartilaginous or bony. Some cysts present a different texture in different parts. In such cases, their cavity is generally divided, by irregular septa, into several sacs, each of which may contain a liquid of different color and consistence; these are termed *multilocular* cysts.

§ II. *Alterations of the elastic Fluids or Gases.*—The gas naturally exhaled in the alimentary canal, may, upon examination of the body after death, exhibit important modifications as to its quantity, distribution and chemical qualities. This latter point has been as yet but little studied, and we cannot tell what advantages may not be derived from a more careful investigation. The diminution or increase in the quantity of gas in the intestines and stomach may be ascertained as well during life as after death. The most important fact to note, in reference to Pathological Anatomy, is the accumulation of gas in one portion of the canal whilst another contains none, or less than its usual quantity; this is a most sure sign of some contraction or stoppage, or other obstacle to the passage of the gas. It often enlightens the physician upon the subject of his investigations, pointing out to him, in some cases, lesions which he did not suspect during life, and which even after death, surrounded by others of more apparent importance, such as peritonitis, might still elude his search, if he were not impressed with the value of this phenomenon.

We sometimes meet with gas in parts which naturally do not contain it, as in the pleura, peritoneum and subcutaneous cellular tissue, very rarely in a cyst, of which we have above given an example (p. 283). Some physicians suppose that these gases may result from a simple morbid exhalation, but the more extended our observations, the more convinced we become that the presence of gas in the pleura, peritoneum and cellular tissue, is almost always the result of a perforation of the intestines, lungs, or some other portions of the air passages, as the trachea or nasal fossæ. We should therefore examine carefully for such lesions. The presence of gas in a part that ought not to contain it, is sometimes a phenomenon of putrefaction after death* and, possibly, in some cases, arises from the decomposition of pus confined in a cyst, particularly if it have been punctured.

3d. Series. — The foreign bodies discovered in post-mortem examinations are of different kinds; some inanimate, others possessed of life, or previously deprived of it. Among those which are inanimate, some are found in the body, as biliary and urinary calculi, intestinal concretions, and those which are found in the articulations, salivary ducts, lungs, uterus, etc. Of those which come from without, some are introduced by wounds, particularly by gunshot wounds; others by the natural passages, as the mouth, anus, urethra in both sexes, or the vagina in women.

The living foreign bodies which are found in man are the oxyures or ascarides vermiculares, which are found particularly in the rectum, the ascarides lumbricoides in the small intestines, the tricocephales or trichurides in the cœcum of those who die of typhoid fever, and many varieties of tæniæ; the tænia lata is the most frequent in France, and is generally met with in the small intestine. Hydatids of various kinds are found in the interior of the viscera, or in the splanchnic cavities. Those called by Laennec acephalocysts are the most common, and are generally developed in the liver. This viscus is moreover the exclusive seat of a species of entozoa called the *fasciola humana* by Breza, being rarely found in man. The kidney is also the exclusive seat of a species of entozoa not less rare, to which the term *strongylus* has been applied. In Guinea, a long white slender worm called the *Guinea worm*, or *dracunculus*, forms in the flesh, principally affecting the negro race.

Such are the principal phenomena revealed by necroscopy.

The various disorders thus disclosed are not of equal impor-

* We assisted at the opening of a stout man who had died suddenly thirty-two hours before. The emphysema which had come on since death was already so considerable as that the volume of the trunk and limbs was nearly double their natural size. The moment the scalpel penetrated the abdomen, which was as hard as a board, the air escaped, producing an explosion as violent as that of a well charged air gun. The alimentary canal had not been wounded, and remained distended. The gas which produced the explosion was therefore collected in the peritoneum itself. The emphysema was so general, that it escaped with the blood in the form of a reddish froth upon incising the vessels.

tance. 1. Some precede the symptoms of the disease, and appear to have produced them, such as crude tubercles, which are often met with in the lungs of persons whose respiration has not seemed affected. 2. There are other alterations which only supervene in the course of a disease, sometimes at a very advanced stage, and which seem rather the effect than the cause; such as the tumefaction of the liver, and the anasarca in persons affected with aneurism of the heart. 3. Other phenomena of pathological anatomy only occur in the last moments of life, as the engorgement of the lungs above mentioned (p. 367), and also, doubtless, the gelatinous and albuminous clots found in the heart and large vessels. 4. Many lesions only take place after death, and are called cadaveric phenomena, as the purple spots formed in the subcutaneous cellular tissue, the transudation of bile which colors the neighboring parts of the intestines, the stomach and the inferior surface of the liver; the disengagement of air which may take place in a very short time, less than twenty-four hours, for example; the infiltration, which supervenes after death, and which is more frequent under some atmospheric conditions, and possibly after particular diseases; the slight effusion of serum found in the serous membranes; the putrefaction which is generally much more rapid in some parts than in others, and which on this very account will be liable to lead to error; to these may be added certain changes in the gastric mucous membrane, which, as Dr. Carswell's experiments have proved, may supervene after death by the corrosive action of the gastric juice upon the walls of the stomach, and may lead us to suspect the action of some caustic poison. Lastly, there are lesions which are met with after death, but which during life produced no apparent trouble in the functions, such as adhesions of the lungs to the walls of the thorax, the white and opaque spots that often exist upon the heart, certain encysted tumors, various foreign bodies, and some incipient organic lesions.

It is of the highest importance to the physician nicely to appreciate these different phenomena. It is with reason that Double in his "*Traité de Séméiotique*,"* pointed out the errors to which post-mortem examinations may give rise, especially at a time when we are possibly disposed to give an undue importance to anatomical lesions; but we do not consider these errors as unavoidable, and think that it is often possible, by carefully comparing and collating the phenomena observed during life, and the lesions found after death, to distinguish, among these lesions, those which have preceded, and those which have followed the development of the symptoms and the death of the individual. — O.

* *Séméiotique Générale*, vol. i. p. 56, et seq.

CHAPTER XIX.

THERAPEUTICS.

IN man, as in other organized beings, there exists an internal force, which presides over all the phenomena of life, in each of its successive periods, contends unremittingly with physical and chemical laws, receives the impression of deleterious agents, reacts against them, and consequently develops the symptoms, determines the course and effects the resolution of diseases, by an action equally impenetrable in all. This force, which constitutes life, commencing and ceasing with it, inherent in the organs, and, (were it not for its abandonment of them after a certain time,) inseparable from them, wholly unknown as to its essential nature, and manifested by its effects alone, while it has been termed by certain authors *vital force* and *internal power*, has been more generally known by the name *nature*,* from the times of *Hippocrates* downward. While physicians admit the existence of this force, they are not agreed in regard to its attributes: some have considered it an intelligent principle† all of whose acts are the result of reasoning, and, as it were, voluntary; others, going to the opposite extreme, make *nature* to consist in the elasticity and oscillation of the fibres, and in the progressive and circulatory motion of the fluids;‡ others, as *Sydenham*,§ have used the term in the same sense which we attach to it at the present day.

Cure, or the transition from disease to health, is the result of a profound change effected in our organs, itself necessarily subordinate to the power presiding over all the vital phenomena: upon this power, therefore, the cure depends. From the fact, however, that many circumstances may embarrass or assist its action, art concurs, more or less efficiently, in the cure of diseases, by properly directing and proportioning the efforts of nature, and removing the obstacles likely to oppose them. Such is the office of *therapeutics*|| (*therapeutice*), the branch of pathology devoted to the treatment of diseases. To treat a disease, is to remove everything likely to exert upon it an untoward influence, and to combine all those means suitable for the diminution of its duration and intensity.

The majority of diseases are susceptible of cure without active treatment, by the powers of nature alone; from this arises the usurped reputation of an infinite number of inefficacious remedies and of a crowd of ignorant charlatans. No disease can be cured by art alone; hence the impotency of medicine in a great num-

* Φύσις, nature.

† VAN-HELMONT.

‡ RAYMOND, *Maladie qu'il est dangereux de Guérir*. p. 20.

§ *Opera Omnia*, t. i. p. 77, 78.

|| Θεραπεύω, I take care of.

ber of the diseases which afflict mankind. Cinchona and the mercurial preparations, justly considered the most heroic remedies we possess, are powerless when nature does not respond to their action. Blood-letting alone will not dissipate inflammation, and the adaptation of the edges of a wound is not sufficient to effect reunion. In surgery, as in medicine, therapeutics, (in the great majority of cases) merely favor the action of nature, which, unassisted, would be able to restore an inflamed organ to the healthy state, cicatrize a wound and unite the fragments of a broken bone.

Therapeutics, properly defined, is but the art of modifying the secret action of our organs, for the purpose of curing or alleviating disease. This assertion seems to us incontestable, even by the most strenuous advocates of the power of artificial means. No one will imagine that we intend to diminish the claims of remedial measures in the cure of disease: on the contrary, we are convinced, that by the omission of suitable treatment, and especially by the influence of improper medication, very slight affections even, may become incurable or fatal; that the greater part of severe diseases would terminate in death; that many others, among which should be classed certain forms of syphilis, would not admit of cure, at any rate, in our climate: we only intend to say that our therapeutical means have no *direct* action upon disease, that they act only by determining modifications in the economy, by means of which that favorable change which prepares and completes the cure, is effected: the extraction of foreign bodies and the reduction of displaced parts are almost the only exceptions. This doctrine, generally admitted at the present day, detracts nothing from the importance of therapeutics, and gives to nature the influence belonging to it: equally removed from the opinions of those who ascribe the exclusive merit of a cure to art or to nature, we believe that the concurrence of both is always useful and often indispensable.

This mode of considering therapeutics exhibits also, its bases: these are, first, the thorough knowledge of the course and *tendency* of diseases towards various terminations, and, secondly, a like knowledge of the proper means for opposing or assisting these tendencies: observation and experience alone can direct us in this difficult study.

Observation, in medicine as well as in all the other sciences, requires, in those about to devote themselves to it, the perfection of the senses, and a mind at once attentive, calm and unprejudiced. Perfect senses are necessary, because by them are established those relations between physician and patient which lead to the knowledge of the disease. The entire attention is indispensable; he who cannot command this, is incapable of proper observation, and whatever tends to divert or enfeeble it, as fatigue of mind or prejudice, will disqualify even an individual who would otherwise be an excellent observer. For this reason, meditation, previous to visiting patients, is injurious to the physician, and it was not without a sufficient motive that *Hippocrates* recommended them to be

seen in the morning rather than at evening, asserting that the physician is more likely to observe well at that hour, as is the patient to reply more distinctly to questions. The most complete composure is equally necessary to the observer; any strong passion absorbs, as it were, all the moral faculties and prevents the concentration of the mind upon other objects. A tender attachment or too lively anxiety incapacitate one for thorough observation and accurate appreciation of existing phenomena. It is a common remark, that a physician nearly always errs in his opinions in regard to the diseases by which his intimate friends are affected; still more decidedly is this the case in respect to affections of which he himself is the subject: on this account it has become an established principle that, in all such cases, no wise man should rely upon himself. In order to correct observation, the mind should be free from prejudice, which, as has been remarked, is a kind of prism, concealing from our view one portion of objects and magnifying and distorting the other, thus presenting an image more or less incorrect and always very imperfect. Systematic physicians have ever been, and always will be, unskilful observers. He who, in accosting patients, is not satisfied with the application of his senses to the examination of phenomena, and with the reception of impressions transmitted by them, but searches for, and wishes to find, in what he observes, the confirmation of previous imaginations, is wholly unfit for an observer, and the results of his observation are generally nothing more than the vagaries of a deranged mind.

A quality more important than any previously enumerated, should be added to the above requisites: viz. *the spirit of observation*. This quality, which implies the union of all the others, but does not always accompany them, consists simultaneously in a sort of natural inclination to examine objects attentively, and in the faculty of promptly detecting and appreciating their relations and discrepancies. It is an innate disposition, capable of development by cultivation, but not of acquisition by those who do not naturally possess it. Sound judgment is also indispensable to the physician, to enable him to rise gradually, and in the proper order, from the isolated observation of particular facts to those general conclusions whose assemblage constitutes pathological physiology.

A physician long accustomed to accurate observation, can, from the nature and form of diseases, their intensity, course, period, etc., without other aid, accurately appreciate their tendencies to various terminations, and, consequently, can decide upon the fitting opportunity for *active* treatment, or prudent *expectation*, which is never, properly speaking, a state of inaction, for it supposes, on the part of the physician, a vigilant attention, necessary, not only in opposing the accidents which may supervene, and in removing everything likely to disturb the progress of a disease approaching a favorable termination, but, moreover, in uniting all the hygienic conditions most favorable to a prompt and complete cure. We can understand how dangerous is that ignorant treatment that

torments with powerful remedies a disease, over which the natural powers alone would prevail, or that unseasonable expectation which delays action in presence of a disease sufficiently severe to compromise life, and whose fatal termination might have been prevented by active medication. Observation alone can preserve the physician from these fatal errors, because it alone furnishes that thorough knowledge of the course and connection of pathological phenomena, constituting an unfailing rule in the treatment of disease.

If the study of the various tendencies of diseases be difficult, the appreciation of the suitable means for favorably modifying organic action is no less so; it is based upon experience, whose foundation is a combination of observation and *experiment*. "*Experiment (experimentum)* differs from simple observation in this, that the knowledge we acquire from mere observation seems to be freely presented, while that furnished by experiment is the result of some trial, made with the intention of ascertaining the existence or non-existence of a thing. A physician who attentively considers everything in the course of a disease, observes; and he who, in similar circumstances, administers a remedy and endeavors to appreciate its effects, experiments. Thus the observing physician listens to nature, the experimentalist questions her."*

Observation occupies the first rank in the delicate study of therapeutical means. It necessarily preceded experiment in the natural concatenation of human ideas and acquirements. Those who were first led to attempt the relief of their species probably derived their original notions from chance, and occasionally from the instinct of the patients, and doubtless tried no experiment until a subsequent period. We have previously enumerated the conditions requisite for observation and will now attempt to sketch the rules which should regulate experimentation.

Therapeutical experimentation seems the most simple and easy thing possible, not only to persons unacquainted with medicine, but also to the majority of practitioners. There is no physician but has experimented more or less with remedies, and drawn more or less positive conclusions from his experiments; yet we all know how few of such conclusions have received the sanction of time, and, consequently, how few there are who appreciate the difficulties of experimentation and the great circumspection and perseverance it demands in order to obtain accurate results. The number of medicines declared by various experimentalists to be capable of arresting the course of intermittent fever may be estimated at several hundred, and yet, among them all, there is but one whose action as a febrifuge is fully proved and universally admitted.†

* ZIMMERMAN, *de l'Expérience*, t. i. p. 22.

† Although the unfailing specific action of the sulphate of quinine has so firmly and justly established it as the remedy *par excellence* in intermittent fevers, we are inclined to consider the assertion that it is "the *only one* whose action as a *febrifuge* is fully proved and universally admitted" as somewhat too positive. We

The number of remedies vaunted as specifics in certain other diseases, as epilepsy or gout, is hardly less considerable, and none of them have stood the test of time and justified the confidence too hastily accorded to them by some experimentalists. The immediate consequences of these facts are, that experimentation in medicine is extremely difficult, and exact experimenters, unfortunately, very rare.

Some experiments are undertaken with a view to determine the action of certain therapeutical agents in a given disease; others, to ascertain the primitive effect of a medicine upon the economy, as its purgative, diuretic or sudorific action. The latter by no means present equal difficulties with the former,

have the best authority for the use of *arsenical preparations* in intermittents. Among many writers who recommend them, may be mentioned Pereira, Copland, Marshall Hall, and Watson; every one is familiar with the extraordinary success which attended the use of the arsenical solution in the hands of its originator. (*Med. Reports on the effects of arsenic in the cure of agues, remittent fevers and periodic headache.*—T. Fowler, 1786.) This is mentioned by MM. Trousseau and Pidoux; (*Traité de Thérapeutique et de Matière Médicale*, 2^{me} édition, tom. i. p. 302;) they also cite the strong testimony of Willan in its favor, who declared "that he knew no remedy more sure, efficacious or convenient to take, than this arsenical solution in the treatment of intermittents." MM. Trousseau and Pidoux remark, that "no one can hesitate, at the present day, to consider arsenic as nearly upon the same footing with quinine, as a febrifuge."—(*Op. cit.* p. 303.) A very elaborate and highly interesting paper upon the use and efficiency of arsenic in intermittent fevers, by M. F. Masselot, is published in the *Archives Générales de Médecine*; (4^{me} Série, tom. x. et xi.) several cases are given where the sulphate of quinine had arrested the paroxysms of the disease, but recurrence occurring, definitive cure was obtained by the employment of arsenious acid in conjunction with emetics. Many important and positive inferences are deduced by the author from his researches, apparently with the greatest reason. The experience of M. Boudin in the Military Hospital at Versailles, is conclusive in favor of this remedy. From a table given by M. Masselot, (*loc. supra cit.*) we extract the following: "Patients treated by sulphate of quinine, 111; return of the paroxysms in 14 cases, 12.5 in 100:—Patients treated by arsenious acid, 311; return of the paroxysms in 10 cases, 3.2 in 100." Most authors, also, testify to the efficacy of the alkaloid *salicin* in intermittents; it possesses very analogous properties with the sulphate of quinine, being, like that salt, an astringent tonic: some have erroneously ascribed to it an equal and even a superior efficacy to quinine; this position it certainly does not hold, and probably never will, but in cases where the latter medicine could not be obtained, salicin would be an invaluable substitute.—(*Dr. Shaper, Intermittent Fever, Lib. Pract. Med.*—*Tweedie*. Am. ed. vol. i. p. 254.—*Pereira, Mat. Med. and Therap.*) Although it requires to be exhibited in larger doses than the sulphate of quinine, it is less likely to irritate the stomach, (*Pereira, Op. cit.* vol. ii. p. 187, Amer. edit.) which is a decided advantage. Miquel accords to it a distinguished place among febrifuge agents.—(*Gazette Médicale de Paris, Janvier*, 1830.) Magendie has seen intermittents cut short in one day by three doses of six grains each.—(*Wood.*) Trousseau and Pidoux, as also Grisolle (*Path. Int.*) wholly deny its febrifuge action, but the weight of evidence is certainly very decidedly in favor of it. While, therefore, the supremacy of quinine as a febrifuge should be acknowledged, can it be said that no other medicine possesses a clearly demonstrated and universally admitted febrifugal action? Arsenic certainly fulfils both conditions, and the febrifuge qualities of salicin are, as it seems to us, "fully proved," if not "universally admitted."—TRANS.

and yet, how many medicines have been entitled diuretics, diaphoretics and even purgatives, whose action does not at all justify the appellations! What physician has not experienced, in many diseases, the impossibility of augmenting the urinary secretion or of exciting abundant perspiration when the system refuses its concurrence? This kind of experimentation is not, then, free from difficulties, but as these are far more numerous when the object of experiment is the observation of remedial action upon the progress of a disease, the rules we are about to propose for the latter, will be applicable, *à fortiori*, to the former.

A physician who experiments, should, in the first place, know thoroughly the nature of the medicine whose effects he would appreciate, the individual upon whom it is to be tried, and the disease for which the remedy is employed.

The first duty of the physician, then, is to know thoroughly the nature of the remedy about to be tried; that is to say, no trials should be made with medicines of whose composition he is ignorant. The Royal Academy of Medicine, authorized by government to estimate the value of secret remedies, has adopted two rules, first, to demand from the holders of such secrets, the exact composition of the medicines, and secondly, to have them prepared by an apothecary of their own selection. These wise precautions should influence those physicians who are requested to experiment with any therapeutical preparation. We once departed from this rule, in favor of a respectable physician, who, without disclosing its composition, requested us to make trial of a remedy in his possession, upon the success of which his future expectations and the support of a numerous family depended. Although the experiments were favorable, and the remedy appeared more efficacious than any that have been extolled in the same disease (*tania*), we have since regretted having consented to its trial without knowing its composition, and from that time have uniformly refused all similar requests.

A knowledge of the composition of the simple or compound remedy submitted to him, should always be the first condition upon which the physician should insist; he should know whether it has been previously employed, and by whom, whether by one physician only, or by several; and if in a few cases, or very frequently. If it have been often employed, and no accidents whatever have occurred, the only doubt being in regard to its remedial efficacy, we may proceed with security, restricting ourselves to the customary doses. But if no previous trials have been made, and particularly, if the article be an extract from a vegetable substance, in itself active, or belonging to a genus of plants containing poisonous varieties; or if it be a mineral, some of whose preparations are energetic in their action; if experiments upon animals have revealed in the remedy, or in combinations containing it, an action sufficiently powerful to compromise life; if it have a strong taste, or if, when applied to the skin, it cause redness, vesication or gangrene, too much circumspection cannot be exercised in the first

trials to which it is subjected. The formidable accidents, whose sudden manifestation we witnessed in a patient at the Hospital La Charité, will always be vividly remembered. We were administering a substance at that time lately extracted by MM. Pelletier and Caventou from *nux vomica*, and called by them *vauqueline*, a name since exchanged for *strychnine*, at the particular request of the excellent Vauquelin. M. Pelletier having requested us to experiment with this extract, which, in his opinion, acted more energetically and equably than the other preparations of *nux vomica*, a young man affected with paraplegia was selected for the experiment, to whom the alcoholic extract of *nux vomica* had been administered for many weeks, a dose of thirty-two grains, daily, having been attained [26.1-4 grs. Troy] without the slightest influence upon the muscles. We received, from M. Pelletier, six pills, each containing one quarter of a grain of strychnine [2058 gr. Troy]; one was given to the patient the first day, two, at one dose, the second, three, in one dose, the third day, without the least effect; (1.1-2 Fr. grains = 1.23. grs. Troy.) A new supply of the remedy was sent for, in half grain doses; M. Pelletier furnished us with two pills only, each containing one grain, being all that he had prepared. Supposing that a dose of one grain, exhibited to a patient who had taken three quarters of a grain on the previous evening, without effect, and, some days before, thirty-two grains of another preparation of the same remedy, would probably obtain no result, and that, having afterwards but one similar dose to administer, it would be impossible to give M. Pelletier the information he desired, we committed the error of passing at once from three quarters of a grain to two grains of a substance whose degree of energy was unknown. About a quarter of an hour after the administration of the remedy, and even before the visit in the ward St. Louis, in which the patient was, was completed, he was seized with convulsive movements, confined, at first, to the limbs, afterwards extending to the respiratory muscles, and fully as intense as in the most severe cases of tetanus, causing, at very short intervals, suffocation so imminent, that, for more than half an hour, we momentarily feared the death of the patient from the violence and duration of the convulsive action of the diaphragm. Our anxiety at this time, it would be impossible to express; the necessity of concealing it from the patient rendered it still more distressing. We remained constantly at his bed-side, deeming it an imperative duty to entrust to no one the care and responsibility of so fearful a position. Judging, from its effects, that the medicine would be absorbed by the stomach, we refrained from exciting emesis, for which (the above opinion being correct) there was no occasion, and which, also, by the muscular contraction it causes, might have increased the violence of the convulsions, thus adding considerably to the threatened danger. A dose of wine of opium, equivalent to about ten centigrammes (two grains) [1.64 grs. Troy] of solid opium, was given immediately; the convulsions and suffocative symptoms persisting and even increasing, the dose was repeated

five minutes after the first, and afterwards, every five minutes, and even at shorter intervals, double the above quantity was administered; the narcotism that might be expected to supervene from so large doses of opium, not being so dangerous, nor the peril so immediate, as that resulting from the action of the strychnine. Finally, after a half or three quarters of an hour's effort and anxiety, the spasms were separated by longer intervals, and the suffocation was less threatening; gradually, and in the space of a quarter of an hour, all the symptoms produced by the strychnine had disappeared, and no effect was observed from the enormous quantity of laudanum taken by the patient, (about half an ounce) except slight somnolency, of a few hours duration, from which he was easily aroused. We have often related the above case in our clinical lectures at La Charité and the Hôtel Dieu, for the same reason that induces us to give it a place in the present work, viz. to show, by this example, to those who listened to the lectures above mentioned, as well as to those who may peruse this volume, with what circumspection experimentation with a remedy of undetermined power should be conducted. We would even add, that when such active remedies have been prescribed for a long time to the same patient, it will be prudent in the physician to resume the lowest dose whenever the medicine is prepared by a different apothecary, or when the same one, having exhausted his first supply, has procured another.

A knowledge of the patient about to become the subject of experiment is the second and no less indispensable requisite; and we mean to imply a knowledge of his morality, judgment and susceptibility. We have mentioned morality first, because when a physician tries a remedy for any disease, and especially, when his first experiments have acquired some publicity, it is not uncommon, especially when he is connected with an hospital, that many persons affected with the disease in question are placed under his care; and, among them, there are, nearly always, some, who, by mistake or fraud, are not actually affected. Individuals have sometimes announced themselves the possessors of a specific remedy for diseases considered incurable, as, for example, epilepsy; and other persons associated with them, have simulated the disease in order to prove the efficacy of the medicine; thus exposing the public to double imposition. We have reason to believe that the seemingly extraordinary effects of magnetism in the treatment of disease, and in the production of certain unusual phenomena, have really been, in many cases, a complete deception, in which one or many actors have played a part by no means creditable. It becomes more important for the physician who experiments, to be on his guard against frauds of this kind, from the fact that he is disposed to hope for certain results in the researches in which he is engaged, and eager to seize upon the favorable effects of a remedial measure, to whose success he attaches the double value of utility to suffering humanity and the advancement of his own reputation.

There is another class of patients who may unintentionally lead the practitioner into error, either by exaggerating the relief or the

exasperation supervening in their sufferings, or by attaching to various symptoms an importance they do not deserve, or, finally, by a mental peculiarity which deceives them in regard to their actual condition, some conceiving themselves to be improving, even till the termination of the disease in death, others complaining more and more, as amelioration is more distinctly perceptible and convalescence approaching or even established. These are evidently improper persons for experiment. The same may be said of the extremely susceptible, and of those in whom some idiosyncrasy exists; the organization in both being too far removed from the usual conditions to admit of drawing conclusions, applicable to the generality of patients, from the experiments to which they might be submitted.

To the most accurate knowledge possible of the means to be tried and of the subject of experiment, that of the disease must necessarily be added. It is an indispensable condition in every experiment, that there be no doubt as to the diagnosis. We can readily perceive how erroneous would be the results of experiment, if, as is too often the case, from the imprudence or ignorance of the experimenter, the trials were made upon one disease, while the conclusions regarded another.

If the diseases experimented upon had a determinate duration and uniform termination like rabies, the effect of experimental measures would generally be easily appreciated. But nearly all diseases are variable in their course, of uncertain duration, and terminate in different ways. Thus, the experimental physician should not only choose cases whose diagnosis is unequivocal, but, moreover, his knowledge of diseases and of their different forms should be sufficiently exact to enable him to foresee the modifications which they may spontaneously manifest, and their tendencies to various terminations: these are indispensable qualifications for determining those of the supervening phenomena that should be attributed to the remedy under trial, and those depending upon the natural course of the disease. We do not hesitate to assert, that to ignorance or forgetfulness of this truth, most of the erroneous conclusions of experimentalists are to be ascribed. Nearly all have referred the favorable or unfavorable changes, supervening in diseases, to the remedy employed. They have misinterpreted the incessant action of the organism upon pathological phenomena, and have attributed to agents, often inert, or even injurious, those favorable modifications in whose production they had no part.

The remedy, patient and disease being understood, experimentation requires, in addition, a peculiar concurrence of circumstances of more or less importance.

It is hardly necessary to premise that the therapeutical agent employed experimentally, whether simple or compound, should be *uncombined* with others. As has been remarked, it is very difficult to appreciate the action of a single remedy upon the course of a disease; the simultaneous employment of many medicines, possessing considerable energy, would render it almost impossible to

decide the value of each one in particular. We must, moreover, assure ourselves that the medicine is used, and in precisely the prescribed manner, nothing being added, removed or substituted.

Another important point is to remove, as far as possible, from the patient, all those physical and moral influences capable of modifying the course of the disease, as well as the action of the experimental means. Change of abode and regimen often suffice for the production of effects too frequently attributed to remedies: many febrifuge medicines have owed their *anti-periodic action* to the circumstance of their prescription on the day after the patient's entry at the hospital. What physician has not often observed, in hospitals, in patients affected with cardiac disease, the disappearance of anasarca, prematurely induced by fatigue or excess in food or drinks, under the influence of a few days' rest and diet; and how many times, in such cases, has not this change, depending on an entirely different cause, been ascribed to remedies wholly inefficacious?

Atmospheric changes should not be disregarded by the experimentalist. Their influence upon the course of certain affections, particularly rheumatism and certain neuroses, is well known, and should not be lost sight of. The changes supervening in temperature exercise an influence upon certain diseases, or upon some of their symptoms, easily productive of erroneous conclusions in regard to the action of the remedies employed. By a repetition of the experiments made by various distinguished physicians upon the action of certain medicines intended to diminish or suspend the sweats of phthisis, we have been led to the following result, that, giving priority in the production of this symptom to the alterations effected in the pulmonary parenchyma, the secondary modifications, daily presented, are principally connected with changes supervening, either in the temperature of the external air or of the patient's chamber, the position of his bed, or, particularly, the continuance of his sleep; for the state of sleep is a condition highly favorable to the production of phthisical sweats. When the air becomes cooler, or the patient's chamber is less heated, when he lies upon a mattress, and the number and thickness of the bed-clothes is diminished, and particularly, when he is awake, the means suitable for subduing these sweats *appear* to have an influence; in opposite circumstances, they most frequently produce no effect.

It is equally necessary for the physician who experiments to be informed in regard to the moral circumstances daily surrounding the individual subjected to the experiment. When a disease depends upon profound and concealed grief, the pharmaceutical agent used to counteract it fails to attain its object; it is powerless when the disease is exasperated and has no influence in its cessation, still the physician is naturally inclined to attribute the supervening changes to the action of the remedy he has prescribed. For this reason, it is the more important to obtain the patient's entire confidence; an accurate knowledge of the disease, as well as of the

appropriate remedies for its relief or cure, results from that confidence.

The influence of the imagination upon the organism is so great, that in a certain number of cases, and in some individuals, the idea that a proposed remedy will cause a determinate effect has proved sufficient for its production. The case of an individual has been cited, who was salivated after taking inert pills, which he supposed to contain mercury; another has been mentioned where purging followed the administration of a medicine which was imagined capable of producing such an effect. It has occasionally been sufficient for the cure of insomnia, to give a pill of crumb of bread or of thridace, assuring the patient that he would sleep. How often has the progress of intermittent fever, even of very obstinate character, been arrested by the use of amulets or any other means, whose action cannot be other than imaginary. When, therefore, we experiment with a medicine, it is generally best that the patient be wholly ignorant of the effect which should be produced by it, so that imagination may have no influence in the phenomena subsequently supervening.

Finally, there is one condition among those capable of modifying the progress of a disease, and consequently of leading to erroneous conclusions in regard to the action of experimental means, which should not be forgotten, viz. the development of a new disease. When this new disease is of an acute character, there can be no doubt as to the nature of this complication and the influence it may exert upon the original disease. But if the secondary affection be slight and slowly developed, or if the patient have any motive for concealing it, it may thus become a source of error: we mention this fact, that the physician may never neglect to inquire daily into the condition of all the functions, and examine all the organs, so that nothing likely to be of service in the difficult task of experimentation, may escape his observation.

In order to show by how many causes of error experimentation is surrounded, we will give an abstract of the trials undertaken by us at the Hospital La Charité, for the purpose of examining the action of the powdered holly (*ilex aquifolium*), in the treatment of intermittent fevers. At our suggestion, twenty-two patients were selected by the central Office of admission, for entry into the clinical wards, as affected with disease of intermittent nature. Before commencing the use of the febrifuge, we were obliged to wait several days for the complete establishment of the diagnosis, and also that the remedy might be employed only in those cases where the paroxysms could neither be suspended nor even moderated by the new conditions in which the patients were placed. The following was the result: of the twenty-two patients sent to the hospital, as affected with intermittent fever, *seven* presented no subsequent paroxysm; *four* had paroxysms decreasing in intensity; *eight* others manifested merely symptomatic paroxysms, connected with slight inflammations of the mucous membranes, which yielded to simple anti-phlogistic measures,

as cooling drinks, diet, and blood-letting; three only of the whole number were found to present the proper conditions for experiment; viz. *essential intermittent fever of full intensity, in the three or four paroxysms succeeding admission to the hospital*: the powdered ilex was administered to these, at first, in the dose recommended by the physician who had extolled the remedy, subsequently, in double, quadruple and octuple quantities, without any appreciable effect upon the progress of the disease. Sulphate of quinine was then given according to common practice and in the usual doses, and the paroxysms were immediately arrested. If the powdered ilex had been administered from the day of admission, to all these patients, or even to the fourteen who were affected with essential intermittent fever, we should have been led to the conclusion that the medicine had acted as a febrifuge in nineteen cases out of twenty-two, or at least, in eleven out of fourteen, and that the three cases in which it failed, were exceptional. Greater circumspection obtained a very different result, viz. that the medicine had not the least action in arresting the disease in any of the cases where it was properly tried: it must be admitted that the number of these was but small.

Experimentation in medicine, as in almost everything else, has its advantages and inconveniencies. If experiment were wholly forbidden, therapeutics would be nearly stationary. Whoever devotes himself to any science, should regard it as a duty to do all in his power to enlarge its domain; and when the object of this science is the cure of disease and the preservation of health, the duty becomes even more imperious and sacred. The strictest appreciation of the action of the means employed, and the use of new means in the management of diseases, are the only two paths capable of conducting to more positive and efficacious therapeutics; and by experimentation, particularly, taken in the most extended sense, this end is to be attained.

That experimentation, whose purpose is a more rigorous appreciation than has hitherto been made, of the action of the therapeutical agents in general use, or a determination of the peculiar conditions in which each of them is more specially indicated, and the proportions in which it should be employed, seems to possess almost unmixed advantages; or if it have some inconveniences, they are owing rather to the unskilful application of the means, than to experimentation itself. This kind of experiment is allowable in all, and every physician who treats a disease by common remedies, should study their effects, in order that each fact observed by him may become, so to speak, an element suitable for the solution of the numerous problems presented by the indefinite perfecting of therapeutics. It is otherwise in that kind of experimentation which consists in endeavoring to find, in new substances, more efficacious remedies for the ills of humanity. Great responsibility is attached to this species of experimentation, which is generally set apart to certain individuals who are prepared for it by a thorough study of all the trials of such nature, previously

made, and of the various success that has followed such experiments.

There are, however, certain rare circumstances where experiment becomes a duty for every one; for example, when called to a patient affected with *communicated rabies*, a disease hitherto constantly fatal, should our efforts be limited to treating so terrible an affection by the same means employed previously without success, or should other remedies be tried, beside those whose inefficacy has been proved? We reply unhesitatingly that experimentation is, in this case, not only allowable, but imperatively demanded; and that an uncertain remedy, suggested by the cause and symptoms of the disease, by theory or empiricism, should be preferred to all those whose insufficiency has been decided.

There are other experiments not allowable in any one: we mean those made with the intention of assisting the diagnosis of a disease considered contagious, by inoculating persons apparently disposed to contract it. In some cases, for example, where doubt had existed in regard to the nature of certain *varioliform* eruptions, inoculation of the secretion of the pustules has been proposed, and even tried upon persons who had never had variola nor been vaccinated. A prudent and conscientious physician will never allow himself to make such experiments, because it is not for the benefit of the individual submitted to them, and the human being should never be an *object of experiment* for the physician, even when the interests of science and humanity are the object, and the greatest advantages might be expected for both.

A single experiment, whatever be the result, cannot establish the general efficacy of any therapeutical measure. Doubtless, it would be a very remarkable event, if the symptoms of rabies were suspended in a single case where a new remedy was tried; a unique fact, even, of this nature, would be a very important result, particularly if from the circumstances antecedent to, and the accompanying phenomena of the disease, it were evident that the affection was really rabies, and not one of those varieties of hydrophobia too often mistaken for it. But even in this case, new experiments would be necessary, in order to form a correct opinion of the effect of the experimental remedy; still more necessary is it to repeat the trials before a final conclusion, if the disease, instead of inevitably terminating in death, when left to itself, like rabies, be susceptible of various terminations. We cannot, therefore, derive satisfactory results from experimentation, except when the disease, influenced by the experimental remedy, terminates favorably in a larger majority of cases, or in a shorter time, than under any other treatment; from this arises the necessity of uniting the greatest possible number of cases, taken from different sources, that is, collected by different observers, in various times and places, and of comparing and *counting* them, in order to attain as positive results in therapeutics as in etiology and semeiology. This conclusion leads us to declare our opinion of the *numerical method*, applied to the study of diseases.

The enumeration of previously collected cases, the deduction of accurate results from their comparison and number, either in regard to the predisposing or determining causes of the disease, or its characteristic phenomena, course and different terminations, or, finally, as respects the influence of therapeutical means, constitutes no innovation in medicine. Many historians of epidemic diseases have adopted this course; they have stated the population of the place where the epidemic prevailed, the number of those attacked, and also that of each sex, of children, adults and aged persons, and the proportionate mortality in these various divisions. In Bayle's work on Pulmonary Phthisis, in nearly all the French and foreign yearly clinical recapitulations, etc., in our own thesis upon rheumatism, in 1813, and in various memoirs read by us either before the Institute, upon the use of sulphate of quinine, or to the Academy of Medicine upon the powder of *ilex aquifolium* in intermittents, this mode of presenting general results is employed as a means of arriving at those more exact, without any one having imagined it improper to draw numerical conclusions from a comparison of cases previously collected. It was at that period, only, when Louis, the most accurate and conscientious observer of our times, thought it right to apply this method, in its highest degree of development, to the solution of many pathological questions, to which the collision of opinions and the ardor of controversy had given great importance, that this mode of deducing consequences from facts was attacked, both individually and in its applications, with a vivacity, inexplicable, except by calling to mind the antecedent contest. In the heat of the discussion that arose in the Royal Academy of Medicine, certain orators arrived at this direct conclusion, that every enumeration of pathological facts was essentially opposed to sound logic, and could not furnish other than erroneous, and consequently, dangerous, results; from thence they argued an absolute proscription of this method, to which the appellations *numerical method* or *medical statistics* have been applied. Without desiring to resume and retrace, in all its details, a discussion, in regard to which there is still a difference of opinion, we deem it proper to examine the main arguments employed against the *enumeration of facts*, and to reply to whatever they may contain that is plausible.

In order to examine this subject methodically, we remark first, that in the enumeration of medical facts, there are two points, wholly distinct, and both requiring particular study. While collecting a large number of cases, comparing them together in all their different aspects, making numerical tables of everything relating to their causes, symptoms, progress, duration, various terminations, and the influence of the different curative means employed, the physician is but an exact historian of actual facts, and if narrations of this sort are uninteresting, they cannot be, and never have proved, (we will not say dangerous) even inconvenient. Let us suppose that two physicians, equally truthful, and gifted with the same spirit of observation, both give an account of

an epidemic which they have observed together; also, that the first, in his description, states the precise number of inhabitants in the city or village where the disease prevailed, the number of persons affected, both those sufficiently so to require confinement to bed, and those who, being less ill, are able to pursue some of their occupations; that he gives, in addition, the number of infants, adults, and aged persons, and of males and females; the proportion of patients engaged in various occupations; the duration, in days, of the disease in these different circumstances; the rate of mortality in each; and let this recapitulation be supported by observations made upon each of these patients during the course of the epidemic. Let the other physician, on his part, relate the results of his observation during the disease, as faithfully as his memory will allow, but without any use of numbers, expressing himself thus, for instance; in a city *rather densely* populated, a *considerable* proportion of the inhabitants were attacked by the epidemic, which was *more* fatal among males than females; its course was *generally* acute, its termination fatal in a *large number* of patients, etc.; we should not hesitate to pronounce the latter account very far inferior to the former, and we should be justified in doubting its correctness when compared with the other, even allowing for the vagueness of the expressions employed. We are, in truth, so easily prepossessed by the first cases that impress us, and so inclined to draw general conclusions from our first ideas, that we need the uncompromising *addition* of numerous facts to confirm or rectify our original opinion. It has often happened to M. Louis and myself, when observing together the same patients, at the Hospital La Charité, to arrive at a conclusion, whose inaccuracy was subsequently proved by a numerical recapitulation of the same cases. It is, then, useful to count the complete cases, and the number of times their development has been preceded by a certain cause, or that a certain symptom has appeared in the course of the disease, also to enumerate the days of its duration, and the number of favorable or unfavorable terminations; and however great may be the antipathy of certain physicians to numbers, we cannot suppose that it can be carried so far as to reject the numerical statement of complete cases; this would be a rejection of accuracy, and, consequently, of truth.

However true a proposition may be, it may always, for want of good reasons, be attacked by specious arguments. Thus, it has been objected that every numerical relation is not exempt from errors, and that the apparent accuracy imparted by numbers, renders it, for that very reason, more dangerous than ordinary narration. We willingly admit that every problem in addition is not necessarily exact, whether it be applied to pathological facts or to anything else whatever; that one may calculate erroneously in medicine as in other matters; it should be added that it is the duty of those who accept a calculation, to verify it. But, it will be said, if the calculation rest upon incomplete, inexact or prejudiced observations, what a multitude of errors will be the result! The

reply is easy ; the numerical method is not in fault, but the observations that have served as a foundation for the calculation. If, therefore, it be attempted to conclude that a measure should be renounced because improperly employed, observation itself must be resigned, under the pretext that there are, in medicine, as in nearly all sciences based upon observation, as many and more, bad, than there are good, observers.

If the numerical method had had no other object than to ascertain everything relating to complete cases, it would, doubtless, never have aroused the violent discussions that have occurred. But in medicine, as all are aware, the past is the instructor of the present ; in the most thorough and accurate knowledge possible of complete cases, all that the physician should know, may, and ought to be discovered, as the causes of diseases, the signs that characterize them or announce their tendency towards a favorable or unfavorable termination, and the proper means for their relief or cure. The numerical method, while it renders the study of thoroughly observed cases more precise, as a natural consequence, elucidates all the branches of pathology and particularly therapeutics ; the controversy relates to these various questions, and we shall examine it in connection with them.

Among the numberless objections that have been raised against the numerical method as applied to pathology, some regard the method itself, and others the improper use that has been or might be made of it. The latter class of objections are nearly valueless ; it can only be considered a kind of warning against the errors liable to be induced by any method of studying cases and drawing conclusions from them, in all the natural sciences as well as in medicine. Observation itself is quite as obnoxious to these objections as is a method which may be termed the *logic of the sciences* : with such axioms to commence with, we should be forbidden to observe, under the pretext, that bad observation is dangerous ; not only should figures be banished from reasoning processes, but reasoning itself, however conducted, should share their fate, because unskilful logic leads directly to error. Without doubt there is both inconvenience and danger in numerical conclusions drawn from facts badly observed, not sufficiently numerous, intentionally selected as more favorable to certain systematic opinions, falsified or imaginary ; the evil, however, would be still greater if this recapitulation of cases, without foundation upon actual facts, were but a deceptive assertion uttered in defence of a theory. But would the fault be ascribable to a method which requires accuracy and truth, as fundamental conditions, both in the facts themselves, and in the consequences resulting from their comparison and enumeration ? These first objections, then, do not deserve a serious reply, for they are not peculiar to the numerical method, but apply equally to all the other modes of scientific procedure and reasoning ; all, without exception, will lead us into error if there be carelessness or deception in those who collect and compare the cases, and unthinking credulity in those who receive

them. We may add, that if the distinction between truth and error be frequently difficult, it is not, at least, beyond the power of the human mind; and that in intellectual, as in moral affairs, it is possible to attain, by effort, the knowledge of the truth. In the case at present under consideration, it is doubtless quite difficult to distinguish the observer worthy of confidence from him who is not so; and also to determine, among the numerous observations daily added to those of former days and ages, those that bear the impress of truth; but the physician who associates a correct judgment with the habit of observing nature, generally acquires the power of ascertaining the degree of confidence merited by men and things. Admitting, even, that inaccurate or even fictitious recapitulations may have momentarily misled physicians upon any one point in our science, new observations and conscientious reviews will soon furnish opposite results: from this arises the necessity, for all observers, of collecting facts bearing upon the same question, and these should also be numerous, in order to attain, by force of numbers, more positive conclusions; upon this depends the triumph of truth. Thus, if the faulty employment of the numerical system have introduced errors into science, the same method, and that alone, skilfully and conscientiously employed, will definitively re-establish the truth. Passing over these objections, we hasten to consider those relating to the actual enumeration of cases, and not to any want of conscientiousness or judgment in those who employ it.

It should be remarked, in the first place, that those who do not collect exact observations, nor note down facts which they observe, and who, after a certain number of years of study and practice, are, consequently, unable to state the sum of these facts, and still less, to know, in each separate observation, the numerical expression of each condition presented by the disease, as regards causes, signs and effect of remedies; who have not thus added up the whole, in order to have the exact sum total, adopt, nevertheless, as the result of their observations and the rule of their practice, an approximate total, which, if they possessed the necessary elements for testing its accuracy, would, perhaps, be very far from true. They wish to count approximatively, to add without figures, and to draw conclusions from this exceedingly imperfect calculation, but they will have no numbers; yet who can deny the value of numbers, wherever applied? Those who have grown old in our profession possess an authority mainly dependent upon the *number* of facts they have observed; for this reason their advice is sought and followed by younger physicians, in serious and difficult cases; from this, also, arises that public consideration and confidence particularly attaching to physicians who, arrived at mature age, and entrusted with hospital practice, have been favorably placed for the observation of a *larger number* of cases and the acquisition of greater experience: numbers may, then, be considered important in medicine, and even those who do not employ the numerical system would not fail to say, in a discussion with a

younger physician, 'We have observed such a fact *more frequently* than you have; such an occurrence is *more common* than another; such a disease has appeared to us to be *often*, or *nearly always*, favorably modified by a certain remedy,' etc. Doubtless this is not enumeration, properly speaking, but it is a species of counting; for, when affirming that a certain occurrence is more frequent than another, there must be some recollection of the number of times that each of the facts has been observed; there must be an *approach* to addition, subtraction and *conclusion*. He who would disregard the *number* of facts observed by him, could not do it; he would be led to keep account of them in spite of his efforts, as if by unavoidable necessity. The power of facts depends especially upon their repetition, and it is impossible for the mind to disregard their number. Every physician, therefore, computes, consciously or otherwise, properly or improperly, the facts he observes, and experience in medicine implies the collection of a large number of cases, accurately or approximatively counted.

Every one is aware that the antagonists of the numerical system are not opposed to *approximative enumeration*, but to the exact addition of facts and figures. When an observer, acknowledged by them in other respects to be accurate and conscientious, commences the addition of the cases he has collected and the deduction of the numerical consequences resulting from their collation, they regard the procedure as a faulty method, both derogatory to the physician, and communicating the worst and most dangerous direction to scientific pursuit! An absurd mode of reasoning indeed, is that which allows, on identical subjects, an approximative and more or less inaccurate calculation, while it forbids those characterized by the strictest accuracy! We shall, however, review the arguments upon which these conclusions have been founded.

"The numerical method," it has been said, "leads to the substitution of calculation for reasoning, and of arithmetic for induction." There is not the least foundation for such a reproach; far from excluding the reasoning process from medicine, the numerical results furnished by the collection and comparison of a large number of cases give to reasoning a more secure foundation and a truer direction, and preserve it from the errors too often arising when it is based upon facts too few in number or imperfectly analyzed and counted. In our opinion, the numerical method is the most suitable system possible for *reinstating* reasoning in favor with those physicians, who, considering only the mistakes into which systematic authors have too often been led by faulty logic, would willingly have proscribed the use of the reasoning powers in medicine for the sake of preventing their abuse!

One of the most plausible objections to the enumeration of pathological facts, is, indisputably, the difficulty of uniting similar facts in order to deduce from them general consequences. The same disease presents such a variety of forms, that perhaps it never occurs twice with a perfect similarity. But the infinite variety of forms existing in animals of the same species, or in the

leaves of the same tree, does not prevent us from distinguishing, notwithstanding the slight dissimilarity observed in these various natural products, the species to which they belong, because the fundamental characteristics possessed by them, in common, are far more evident than the shades of difference they exhibit. The same is true in pathology, as has been fully established by M. Rayer, and diseases, when divided into genera, species and varieties,* may be easily compared and enumerated, thus affording exact conclusions. Let it be supposed, for example, that in all the cases of mild tertian, of herpes zoster, variola discreta or confluenta, acute pneumonia, lenticular cataract, furunculus, and erysipelas of the face, the disease is developed in individuals previously in good health and of adult age; we then have a collection of cases that may be compared, and susceptible of furnishing, by this process, numerical results presenting many points of interest. We would, moreover, ask those physicians who derive their antipathy for figures from the dissimilarity of diseases, if this want of resemblance be not quite as much an obstacle to general descriptions of diseases as to the enumeration of isolated facts. If, therefore, those physicians who have written upon general pathology, have not been arrested in their labors by the infinite dissimilarities that cannot have escaped their notice; if their descriptions be considered not only useful, but indispensable, in the study of medicine; if many authors owe the high reputation heretofore and at present accorded to them in the medical world, to researches of this nature; why should hindrances be thrown in the way of the partisans of statistical medicine, when every one sees the necessity of avoiding them, and which, without any compensation, would reduce medicine to its condition in primitive times, that is, to a mere collection of isolated observations inscribed successively upon daily records, like those upon the columns of the ancient temples? The idea that no conclusions should be drawn from pathological facts, except so far as they present a complete identity, (an identity not to be found in nature,) is a blind assumption which should be condemned by good sense and the power of facts.

"Disease," it has been remarked, "being composed of various elements, cannot be subjected to calculation like a single phenomenon." — "The advocates of statistics," it has been added, "while they enumerate all the details of disease, separate its elements from one another into so many different divisions that, subsequently, it is impossible to reconstruct the disease."

Thus, according to one class of objectors, the numerical method is inapplicable to pathological studies, because it considers a thing essentially complex as a unique phenomenon, and, according to others, because it examines, singly, each constituent element of the disease. Although these two objections antagonize one another, as

* See the chapters entitled, "The different Genera, Species and Varieties of Diseases"; and "Diagnosis."

it were, as it is possible that one of them may have some foundation, we deem it proper to examine both.

We have previously declared disease to be complex in its nature. Therefore, whenever the numerical method is applied to the study of any disease, it is absolutely necessary, as we have already remarked, to divide the cases into as many groups as the diversity of its assumed forms, or the various conditions in which it is manifested, may require. The enumeration and comparison of the cases comprised in these separate groups supply us with conclusions which are always interesting, whether they are or not, in accordance with generally admitted opinions. Not only has care always been taken, in the application of the numerical method to the study of disease, to subdivide the particular cases according to their analogies, but, moreover, the elementary conditions of these subdivisions have been separately examined, as, for example, the causes, duration, termination and action of different remedial means. There is, perhaps, no numerical collection hitherto published that does not contain all these details. How then can we imagine it possible that statistical medicine should be reproached with considering a disease as a unique phenomenon? The opposite objection is less surprising, viz., the subdivision of diseases to an extent rendering it impossible to reunite their elements. This objection is, however, more specious than real, and is quite as easily refuted as the other. The authors of nosographical works of any extent, after having described the disease generally, have nearly always considered the chief characteristic symptoms separately, as, for instance, in pneumonia, the pain in the side, dyspnœa and sputa, and have pointed out the different degrees of intensity and the other varieties presented by these symptoms. They have also devoted separate articles to the examination of some of the causes and of the *modus operandi* of certain remedies. The same is done by means of the numerical system; the details, it is true, are not so interesting, because they are expressed in figures only; but, in reality, as we cannot examine each element of a disease collectively, we are compelled, whatever be the method employed, to examine them successively; whether it be into articles or columns, by means of words or figures, they must be separated, or if the expression be preferred, *scattered* (*éparpillé*); and we cannot see that the re-collection of the elements of the disease, if deemed necessary, is more difficult in one case than the other.

It has, moreover, been asserted, "that statistics tend to establish fixed modes of treatment." If medical statistics, resting upon natural bases, could lead to the result, that, in a given disease, a certain treatment would be constantly followed by more complete and rapid success than any other, we should be obliged to confess, that science would derive therefrom very decided benefit. But from the great accuracy it gives to the cases subjected to its application, it is quite unlikely that it will ever attain such a result. It will, more probably, lead to an exposition of the more or less numerous

exceptions to those general precepts which the mind is but too readily disposed to establish and accept, when computation is not employed: the evident mission of the numerical system is to destroy these illusions.

It has, moreover, been advanced that "this method disregards minorities and exceptions." If we admit that a certain fact is of so general occurrence that there is but one exception in a hundred cases, the enumerator will be obliged to record the proportion in figures, thus, 1 and 99; while he who never computes, impressed by the *frequency* of the fact in question, will readily conclude that it is *constant*. He who never adds cases together may easily and conscientiously forget minorities, while the physician who employs the numerical method is obliged not only to consider the exceptions but to give their number.

"The most useful therapeutical axioms have been discovered without the aid of statistics." The object of statistics is not, and cannot be, discovery, in the common acceptation of the word: its purpose is to verify discoveries, appreciate the value of opinions, and occasionally to reveal general truths previously unknown, but not to imagine or invent. If, therefore, the assertion that nearly all the valuable truths in therapeutics have been discovered without the assistance of statistics, be correct, it should also be remembered, that there is decidedly no process so prompt and sure for confirming or disproving general therapeutical precepts, as the numerical method.

"The physician must be guided at the bedside of the patient by the knowledge of indications alone, and not by statistics." To this objection we reply by the following questions: What is the basis of the knowledge of indications? How is it known that a certain case requires blood-letting, and another, cinchona or ferruginous compounds? Is it by theoretical opinion only, or because experience has shown the utility of these several means in cases similar to those under observation? What constitutes, moreover, the basis of experience? Is it not founded upon observations and experiments *sufficiently numerous* to establish the therapeutical action of various agents; and are not statistics thus proved to be the strength of that very science of indications which has been cited as in entire opposition to them?

One of the most serious objections raised against medical statistics is that of M. Gavarret, whom we are far from considering an opponent of the system. "However numerous," says he, "may be the facts collected for the purpose of attentively examining any point in medicine, we may still infer, that if the number had been greater, the statistical results would not have been the same, and that if the same observer had continued his researches for a longer time before enumerating the cases, he would have arrived at different conclusions."

It should be remembered that the numerical method is applicable only to complete cases; and that, assuming the principle stated by M. Gavarret, the application of enumeration must be indefinitely

suspended, because the collection of a million of cases even, would give results which might be modified, however slightly, by a comparison of double that number. Admitting such a principle, and applying it in its full extent, all general description must be abandoned: for the reunion of a larger number of facts would modify that also. Doubtless it may be advantageous, and even necessary, to include in numerical summaries the greatest possible number of analogous cases; but this consideration should not retard indefinitely the enumeration of those observed. As we have previously seen, the progress of science would thus be impeded, from an exaggerated apprehension lest it should wander from the true path.

We remark, moreover, that the numerical system has not, and cannot have, the pretension of fixing, from the present moment, the laws of our science, or of establishing limits beyond which the mind will find nothing to discover or rectify. The observer who publishes a number of cases, compares them and deduces from them numerical consequences, by no means pretends that a recommencement of the same task is superfluous; far from this, he encourages all, by example and precept, to follow the same course, convinced that the truth can only gain thereby, either from the entire confirmation of the results he has obtained, by new observations, or that from the collection and comparison of new facts, conclusions more or less at variance with his own may be obtained.

It should, however, be remarked, that it is not always indispensable that a considerable number of cases be collected, in order to obtain interesting results and conclusions, which, in all probability, will be confirmed by time. When a physician who devotes himself to observation makes a numerical review, at the year's end, of those diseases whose history he has recorded, and by comparing the results of the succeeding with those of preceding years, ascertains, that upon certain points in etiology, diagnosis or therapeutics, the numerical conclusions are uniformly the same, it is *very probable*, to use no stronger expression, that the constant occurrences of each of the past years will likewise characterize those which are to come. Supposing, also, that an observer does not commence computation until after a long time devoted to the collection of cases, as, for example, ten years, and that, having, in the first place, collected and computed all the facts relating to a given disease in one general table, and analyzed their separate elements, he next subdivide his observations into yearly tables, still finding that the proportions in the single years correspond with those of the general table, and consequently resemble each other; such a constant reproduction of the same facts, for ten consecutive years, will certainly allow of drawing conclusions, which, although not absolute, will be very valuable.

A final objection against the numerical method is, "that it leads to the use of fictitious averages, which are useless in pathology and therapeutics." In the first place, we will acknowledge that a deceptive application of these averages may be made; that if, for

example, in collecting a considerable number of facts relating to pneumonia, (a disease infinitely more serious from the second to the fifth year, and after the sixtieth,) and endeavoring to establish the *mean* age in fatal cases, the ages of children and old persons were confounded in one enumeration, a mean age would result quite evidently incorrect and in glaring contradiction with the very facts upon which it was founded. Age has so great an influence upon the result of the disease, that it is absolutely necessary to study pneumonia in each of the vital periods and obtain the average mortality peculiar to each. The same process is required when the duration of any disease is considered, as of acute articular rheumatism; if many groups be not made, of which one shall include the greatest number of cases whose average duration is from fifteen to eighteen days; another, the exceptional cases, where the duration is much less or far greater, there will result a mean continuance which will be insufficient and will not indicate the limits within which the varieties of the disease are comprised. The same is true when we would determine, not only by the numerical, but by any other method, the doses in which it is proper to administer the various remedies: several average doses should be established, one of which will apply to the greatest number of individuals and the others to the rarer cases, where the dose of the remedy should be increased or diminished according to the age and susceptibility of the patients, and the obstinacy and severity of the disease. This supposes, indeed, numerous facts, collected with great care and judiciously compared; but, whatever method be adopted in the practice of medicine, are not these conditions indispensable in order to obtain accurate conclusions?

In concluding this discussion, doubtless too long continued, and which we should not have undertaken if its *actuality* had not made it imperative, will a deliberate answer be expected to the singular charge, that the numerical method would detract from the consideration in which physicians are held, either by rendering them all equal, or by lowering their qualifications beneath those of the most obscure artisan? * Does then the numerical method, by furnishing a more solid foundation for the conclusions drawn from particular cases observed in all ages and places, by adding new general facts to those already belonging to science, by offering an additional means of distinguishing truth from error, diminish the importance of the physician? And will the science, which, of all others, demands the greatest perseverance in its researches, embracing so extensive a range of knowledge that the powers of the human mind and an entire life are hardly sufficient for its acquisition, requiring so much sagacity and circumspection in its applications, descend to the lowest rank in the scale, from the moment

* "If the numerical method were adopted, it would place all physicians upon an equality. — If therapeutics were to be regulated by the computations of the adherents of statistics, there would be more skill in the trade of a cobbler than in the practice of medicine." — (*Séance de l'Académie Royale de Médecine, du 25 Avril 1837 et suivantes.*)

when a surer method is interposed for the appreciation of the facts upon which it is based? If the numerical method tends to *equalize all physicians*, by reducing the most difficult of the arts to certain rules so simple and clear that the most limited intelligence suffices for their application, far from being proscribed, it should be ranked above all that the human mind has ever conceived that is useful and wonderful. Let those be encouraged, however, who so much fear an equality, the very idea of which offends them. Medicine, in its imperfect development, will always present an unlimited field to the practitioner, where numberless obstacles will be encountered, and in which talented minds will show their power and superiority.

Having examined each of the principal objections to the application of the numerical method to pathological facts, we think it may be concluded that this system must lead to eminently useful results, provided it be founded upon observations entirely correct and sufficiently numerous, that no more be expected from it than it can give, and that the necessary accuracy and discrimination be employed in its application.

The length of the discussion into which we have been led, obliges us to return to the point where it was commenced. Having established the principle that therapeutics are based, on the one hand, upon a profound knowledge of the natural tendencies of diseases to various terminations, and on the other, upon the proper means for opposing or encouraging these tendencies, we added, that observation and experience were alone able to direct us in this double study. We have pointed out the conditions necessary for accurate observation and the principal rules for experimentation in medicine, which led us to discuss the application of the numerical method to pathology. We return to our starting-point; that is, experience, considered as a basis of therapeutical science.

Experience should not be confounded with experiments (*experiences*); the latter are to the former as the materials to the edifice. When the influence of a certain therapeutical agent upon the progress of a given disease has been ascertained by numerous experiments, its effects are then *sanctioned* by experience. Thus, the power of cinchona over intermittents, and the influence of diet in acute diseases, is established by experience. This experience is accurately transmitted from age to age, both by tradition and books; it belongs to no individual, but to the science itself.

There is another kind of experience which is differently transmitted; it is that acquired by the physician; it belongs to him, and dies, almost entirely, with him. *Zimmermann** defines it to be the art of preserving the human body from the diseases to which it is exposed, and of treating it when actually laboring under disease; it results from the observations of each physician in particular. In order to possess this experience, much, and particularly accurate, observation is necessary.

* ZIMMERMANN, *de l'Expérience*, t. i. p. 22.

If the talent for observation were equal in all, experience might be estimated by the number of years, according to the vulgar standard, but it is so variously distributed, that age cannot be considered an indication of the degree of experience. Every year adds to the experience of some physicians, while the longest life is insufficient to impart it to others.

The physician's private experience, it has been said, dies with him, because there are certain things of which he judges *instinctively*, and for which he cannot himself account, much less communicate them to others. We do not adopt this opinion. Admitting that there are some impressions with difficulty accounted for by the physician, and which are yet more difficult of expression and transmission, we still think that, in these very cases, the physician can and ought to discover, by attentive examination and active analysis of the past circumstances and existing phenomena of the disease, the reasons for his diagnosis and his consequent determinations; these reasons once ascertained, there can be no real hindrance to their expression. We should not, then, consider this power of forming *instinctive* opinions as the result of long experience; it is only the proof, either of the habit of incomplete observation of pathological phenomena, or of an indolent mind that does not apply itself sufficiently to the scrutiny of their value. In our opinion, an enlightened and conscientious physician should know how to avoid these vague conclusions and be able to communicate his own experience to those who observe his daily practice. This direct transmission constitutes what is termed *traditional medicine*, which is the most useful form of instruction, and renders evident that very remarkable and well known difference existing between physicians, who, during their term of preparatory study, have seen much hospital practice, and those who have gathered all their information in theoretical courses and from books. Attendance on the medical visits of distinguished physicians is the most suitable means for the rapid acquisition of experience by the student. It has been justly remarked, "Medicine cannot be learned except by association with physicians and patients; the physician cannot be self-formed; an experienced guide is necessary, without whom, the student loses his way among the various systems, or becomes an empiric."* Tradition is so highly important in the practice of medicine, that there is, perhaps, no example of a skilful practitioner who has not enjoyed the instructions of an experienced teacher. In medicine, as in all practical arts, there are many hints of more or less value communicated by the physician to those who observe his practice, and which could not be otherwise transmitted. When an intelligent and well instructed student has followed any practitioner for a certain time, he can nearly always announce, after examining a patient, not only what treatment his instructor will adopt, but even the remedial formulæ he will prescribe. What work could give

* *Essai historique sur la Médecine en France*, by J. B. L. Chomel, Paris, 1762.

us such accurate knowledge, and who can flatter himself that he could tell what *Fernel* or *Boerhaave* would have prescribed in a given case?

Observation and experience serve as guides in the treatment of diseases only by the aid of the *reasoning powers*. This it is which points out the analogy between various affections and leads the physician to apply, in his own practice, the means that have proved beneficial in that of others. Reasoning cannot, then, be proscribed in medicine, as blind empiricism would advise;* but the only kind that should be employed, as *Sydenham* has judiciously remarked, is simple and natural reasoning, derived from good sense and apparently the *immediate consequence* of the facts observed. Whenever a course of treatment is resolved upon after a long series of arguments more or less ingeniously linked together, errors are almost inevitably committed, equally injurious to the physician and dangerous to the patient.

Some have endeavored to substitute other foundations for therapeutical science than observation and experience aided by natural reasoning; the physical and chemical theories have led their partisans to advocate the possibility of establishing the treatment of diseases upon a new basis. Natural philosophy is useful in some of its applications to a certain number of affections, particularly mechanical lesions. An exact comparative analysis of the fluids and solids, both in disease and health, with that of the remedies employed, may likewise furnish, in certain cases, important indications. For example, when a chemical agent introduced into the stomach causes toxicological symptoms, we may, while the poisonous substance is still contained in the digestive canal, endeavor to neutralize it by means of the reagents designated by chemistry. When the urinary passages contain concretions of uric acid, the use of alkaline remedies may dissolve them and consequently procure their expulsion. In diabetes *mellitus*, while the concurrence of chemistry is requisite in tracing the changes that supervene in the proportion of the saccharine principle, several useful indications are also furnished by it for the treatment, in regard to the choice of alimentary substances the least likely to furnish the elements of sugar. But with the exception of a few diseases, chemistry is but of slight service in therapeutics, and the error of those chemists who compare the human body to an inert vase, wherein they separate, precipitate or disengage the constituent principles of inorganic bodies or of organized substances no longer subject to vital laws, has been too long refuted to require any opposition on our part.

* "An empiric in medicine is one, who, totally disregarding the operations of nature, the signs and causes of diseases, the indications, methods, and, particularly, the discoveries of different ages, merely asks the name of the disease and administers his drugs at hazard, or mechanically, following his routine and misunderstanding the science. His experience is always deceptive, because he practices ignorantly and follows the prescriptions of others without inquiring into their causes, essence or purpose." — ZIMMERMANN, *Traité de l'Expérience*, t. i. p. 19.

We have endeavored to give an accurate idea of therapeutical science; we have examined its foundations; its applications will be next considered.

Therapeutical science may be naturally divided into two branches; to the first belong the indications; to the second, the means for their fulfillment.

ARTICLE FIRST.

Indications.

WHEN the physician has discovered, by attentive examination of the patient, the kind of disease with which he is affected, its peculiar character, progress, tendency to favorable or unfavorable termination, its productive causes, influence upon the health, etc., these united circumstances show the method of treatment to be pursued, and apparently *indicate* it: this is termed *indication*. It has been also defined to be the manifestation, furnished by the disease itself, of the treatment likely to ameliorate the patient's condition.

Indications should never be established upon theory or abstract reasoning; they should spring, as it were, from the phenomena of the disease, and present themselves, unsought for, to him who has become acquainted with all the concomitant circumstances. It is rarely necessary, and often dangerous, to seek for indications when they are not present: we are liable to imagine their existence, and to misunderstand those which afterwards supervene in reality; at the bedside alone, and in proportion to the development of the disease, can they be distinguished and apprehended; with this signification, the following axiom, taken from an art very different in its results, but analogous in its principles, has been applied to medicine by a celebrated physician: * "*We should take counsel in the arena (consilium in arenâ sumere).*"

There is a certain number of circumstances in disease capable of supplying indications. The principal are the kind of disease, its peculiar form, its intensity, its type and its periods. The state of the strength, the predominant symptoms, seat, complications, causes and certain commemorative circumstances, the tendency of the disease to various terminations, the influence it may exert upon the patient's constitution, or upon pre-existing affections, the effect of previously employed means, either in the case in question or in others, and during epidemics, furnish indications which should not be neglected; we shall give a brief explanation of these indications.

A. The *genus* of the disease is the most influential of all the conditions from which indications are derived. The approximation of the edges of a wound, the coaptation of fractured bones,

* DUMOULIN.

restoration of displaced organs to their natural position, maintenance of an inflamed part in complete rest, and of a position the least likely to induce stagnation of the blood, the removal of everything which might increase the pain; blood-letting in pneumonia, the administration of cinchona in intermittent fevers, and of mercury in syphilis, are each, in these various diseases, the first, as well as the most important, indication. Pathological anatomy concurs also in furnishing very important indications, by revealing the seat of a large number of diseases and the peculiar changes wrought by them in the tissues of our organs. In many cases, however, other indications occur,* which should not only be considered, but may even exceed in importance those derived from the genus of the disease.

B. The peculiar *character* of the disease is of great importance in regard to treatment. There are many acute affections which uniformly tend, of themselves, when regular in their progress (*maladies légitimes*), to a favorable termination, and consequently need no active treatment; while energetic means are required when they are of inflammatory or adynamic character, etc. In such cases the principal indications arise from the character of the disease, and those furnished by the genus are only of secondary value. This is observed in erysipelas, bronchitis, and the morbillous eruption, when manifested in one of the forms previously mentioned.

C. Very important indications are supplied by the *type* of the disease. Experience having proved that all regularly periodical diseases are susceptible of arrest by peculiar treatment, it is of the greatest consequence that the intermittent type be distinguished when present, and advantage taken of the valuable indication it affords, especially in the *malignant* form of these diseases. The patient's life is here in the physician's hands; if he neglect the offered indication, death is nearly inevitable; if he fulfil it promptly, health may almost always be restored. The different intermittent types give rise also to some secondary indications; the shorter the interval between the paroxysms, the more energetic should be the treatment; this becomes far more necessary when the paroxysms approach still nearer and the type tends to the continued form. In certain irregularly intermittent diseases, it has been stated that by

* We deem it proper to quote the very judicious reflections of *Laennec* upon this subject: "I think that the study of pathological specimens is the only base of positive knowledge in medicine, and that it should never be lost sight of, unless we would pursue chimeras and create phantoms merely for the purpose of contending with them . . . But I also consider it equally dangerous to give so exclusive an attention to the study of local affections, as thereby to lose sight of the different causes on which they may depend, or, in other terms, their evident or obscure nature. The necessary inconveniences arising from so restricted a mode of study are an assumption of the effect for the cause and exposure to the still more serious error of considering as identical, diseases in which the only visible alterations are lesions anatomically resembling each other, and treating them all similarly.

attentive observation of the reproductive causes of the attacks, their return has been regulated, and the specific remedies subsequently administered with advantage; but it must be confessed, that the action of cinchona in diseases artificially rendered periodical, is not so well established as in natural intermittents. For this reason, we cannot place entire confidence in the ingenious method employed by Professor Dumas of Montpellier, who, in a case of epilepsy, first rendered the attacks regular, and then administered cinchona.

D. The *state of the vital forces* is decidedly one of the most important indications. Whatever be the genus of an affection, its species or its type, it is of as much and even more consequence to diminish excessive vital action and to sustain it when too far depressed, as to treat the disease; on this account, it is indispensable that the physician keep constantly in view, and attentively compare, the probable length and the violence of the disease, with the strength of the patient.* He should be particularly on his guard against debility, which might either cause the patient's death before the usual period of termination of the affection, or embarrass the series of phenomena or the necessary efforts for the re-establishment of the functions. This indication becomes so urgent that it should, when life seems nearly extinct, supersede all the rest, and lead to the employment of the appropriate means for supporting vitality, even in affections which seem to call for remedies of an entirely opposite character, as in pneumonia, for example, or any other phlegmasia: the ancients styled this the *vital* indication.

The estimation of the vital powers in disease constitutes, therefore, one of the most interesting points in practical medicine. Nearly all therapeutical systems have been based upon the division of diseases into sthenic and asthenic, active and passive; and in a considerable number of cases, the principal question is to know whether the treatment should be tonic or debilitating. It is, then, of the greatest importance to determine the signs by which the vital force may be estimated, especially in acute diseases, where all delay is dangerous and error causes very serious consequences.

It should be remembered that such an estimate of the powers of life is, in a certain number of cases, very obscure and difficult; to be convinced of this, we only need to glance at the divisions established by *Brown*, and also at those substituted for them by authors, who, like Broussais, were led to adopt an analogous division, founded upon opposite principles. The same affections are enumerated, in one of these systems, among those characterized by excess, which in the other are marked by diminution of vital action. The same obscurity may perplex us at the bedside, and it has sometimes happened that cinchona has been advised by one physician for the same patient, in whose case another had pre-

* *Galen* compared the patient to a man carrying a burden, the disease to the burden, and its duration to the distance to be traversed by the bearer.

scribed blood-letting. It is, however, but just to say, that such difference of opinion is hardly ever manifested except among systematic physicians, and that there is scarcely an example among skilful observers, accustomed to collect all the information that can aid them, before resolving upon any mode of treatment.

There are many physicians who estimate the state of the vital powers almost entirely by the pulse; if this be full and resistant, they are, according to them, necessarily in excess. The most violent partisans of the doctrine of irritation have gone still farther; the frequency of the pulse, which in acute diseases increases with the debility and is never greater than in the death-struggle, was for them a sign of excessive vital action, or, what is the same thing, an indication for the employment of the antiphlogistic treatment. Others have adopted, as a criterion, the energy of the movements, the color of the face, or the strength of the constitution; certain others, the pale or deep color of the urine; many, the state of the general heat; others, finally, the power with which the heart contracts. Many of these signs are certainly highly important in the estimation of the vital forces, and none should be neglected; but doubtless, also, each of them when isolated from the rest is insufficient. If examples were necessary to prove this, we might cite the weakness of the pulse in certain inflammations accompanied with severe pain; its hardness, persisting even till death, in certain cases of hypertrophy of the heart; the sensation of general coldness at the commencement of the most acute phlegmasiæ; and the convulsive movements succeeding profuse hæmorrhage. But we need not insist upon a doctrinal point, upon which all experienced practitioners are agreed, viz.: that in the estimation of the vital forces, all the signs likely to express their degree should be taken into consideration.

The vital powers may be modified in various ways in disease; they are augmented, diminished, suspended, perverted or oppressed. They may also present no evident disturbance, as is occasionally observed in diseases limited to one organ, and which do not, apparently, disturb the others.

Increase of the vital forces is generally characterized by a lively red color of the skin, redness and intumescence of the face, regular and confident movements, full respiration, strong pulse, increased heat, firmness of the muscles, marked diminution of the excretions, particularly of the urine and fæces, and that amendment which supervenes in the symptoms after spontaneous hæmorrhage. The blood is observed to be of firm consistence and a vermilion color, and contains a greater proportion of fibrine and corpuscles. These phenomena are rarely observed united in the same individual; in their different combinations and intensity they present very various gradations, either in different patients or in the course of the same affection; they are, generally, far more strongly marked at the outset of the disease and in the paroxysms, than during the remissions or towards the decline.

Diminution of the vital forces is denoted by pallor of the cutane-

ous surface, shrinking of the features, languor in the attitude and motions, faintings, frequency and feebleness of respiration, weak pulse, diminished heat, sensitiveness to cold, flabbiness of the muscles, and the abundance and tenuity of the excretions. If hæmorrhage occur under these circumstances, the other signs become thereby more manifest, and the effused blood is paler in color and less consistent than in health. — Diminished vital action may assume various forms; in some acute diseases, it may become quite decided in a few days; it is then evidenced by collapsed features, pale skin, difficulty or impossibility of maintaining the erect or even the sitting posture, diminution of heat, cold sweats, involuntary excretions, deliquium animi and syncope.* These signs are usually more distinct during the remission; they are veiled, as it were, by the transient excitement constituting the paroxysms; consequently, we here observe the contrary of that which happens when the vital force is in excess, and where the sthenic character of the disease becomes more marked in the exacerbations. There are, however, some affections in which the debility becomes more decided in the actual paroxysms; this occurs in many varieties of malignant fevers, as the syncopal form, [a variety of intermittent in which there are one or more fainting fits in every paroxysm. Dunglison. — Med. Dict. A form of frequent occurrence, — death is almost inevitable after a second paroxysm. Grisolle, Path. Int. vol. i. p. 149.] and febris algida: [*algor*, cold, — a pernicious intermittent accompanied by icy coldness, often fatal in the second or third paroxysm. Op. sup. cit. — Tr.]: diminution of the vital forces, which is hardly noticed during the intermissions, is at its extreme in the paroxysms. In chronic diseases, debility supervenes but slowly; its principal indicatory signs are emaciation of the whole body, but particularly of the face, increasing difficulty of motion, rapidly induced fatigue resulting from bodily or mental exercise, feebleness of the pulse, sensitiveness to external cold, sometimes œdema of the cellular tissue, and passive sanguineous exhalation from different parts of the body; it rarely attains such a degree that it prevents patients from moving in bed, as happens in many acute diseases.

Complete suspension of the vital phenomena, in syncope, congelation and asphyxia, indicates a momentary *abolition* or *suspension of the vital forces*.

* The terms *defaillance* and *syncope* are considered synonymous by Dunglison and some others, but Nysten (Med. Diet.) points out the shade of difference between them which is also implied in the text (See, also, p. 115.) *Defaillance*, which we have rendered *deliquium animi*, is the first stage of syncope and might be aptly designated *fainting*, consisting as it does in the sudden diminution of the heart's action, *progressively continuing*, with greater or less rapidity, until the syncopeal state is fully attained, or else *arrested* by remedial means previously to complete syncope. Lipothymia is characterized by the *persistence* of respiration and circulation, sensation and motion being only *diminished*; syncope, by *entire suspension* (*usually momentary*,) of sensation, motion, respiration and circulation (*syncope confirmée*. Grisolle. Path. Int. vol. ii. p. 697, 2d edit.). The distinction seems highly appropriate. — TRANS.

Perversion of the vital forces is denoted by a more or less manifest change in the union or succession of those phenomena considered capable of indicating their measure: at one time it is the simultaneous existence of symptoms not generally observed united, at another, a rapid succession of phenomena opposed to one another, and still more frequently, sympathetic disturbance of the cerebral functions, particularly the intelligence, sensations, expression of countenance, gestures and movements. Perversion may co-exist with augmentation and diminution of the vital forces, or be manifested singly. From this arises the difficulty of perceiving the indications in these embarrassing cases, and the disagreement of authors and practitioners upon this important point in therapeutics.

Oppression of the vital forces* is that state in which there is apparent diminution, but actual augmentation of the forces; it is manifested, indeed, by phenomena nearly resembling those characteristic of diminished vital force, as collapsed features, pallor or lividity of the face, difficult motion, torpor of the senses and intellectual faculties, feebleness and sometimes inequality of the pulse, coldness of the extremities, etc. In such cases, we must refer to antecedent circumstances in order to appreciate the actual state of the forces. Real debility almost always arises from evident causes, existing in individuals naturally feeble, or weakened by excessive fatigue of body or mind, by prolonged grief, privation of food, or the ingestion of that but slightly nutritive, excessive evacuations, watching, and the abuse of physical pleasures. Oppression of the forces, on the contrary, occurs particularly in strongly constituted individuals of mature age, who are high livers or even epicures; it takes place suddenly, at the invasion, or at least in the first period of diseases, while real debility is observed, generally, to be progressive and to occur in a later stage. In obscure cases, where nothing that may elucidate should be neglected, the color and consistence of the blood effused in hæmorrhage or drawn by venesection, leeches or cupping glasses, the peculiar aspect of wounds and blisters, and the qualities of the pus secreted and discharged by them, deserve, also, the physician's attention. Another very suitable means for ascertaining the state of the forces is observation of the changes supervening in the intensity of the disease, either from the effect of the first remedies employed or from other circumstances. If debilitants, and, particularly, blood-letting, have procured relief; if spontaneous hæmorrhage or alvine evacuations seem to diminish the debility, oppression of the forces doubtless exists. If, on the other hand, spontaneous or artificial evacuations have proved injurious, if wine and cordials have moderated the intensity of the disease, the diminution of the forces is real,

* Oppression of the forces is that condition at the commencement of the phlegmasiæ, fevers, &c., in which the system is oppressed rather than debilitated: the patient is embarrassed by excess of the vital forces (Nysten, Dict. Médecine): vascular action rises, as the obstruction to free circulation is relieved by bleeding, purging, &c. (Dunghlison.) — TRANS.

and the physician should act accordingly. Another sign, to which the greatest importance was attached by *Laennec*, should be added to the above; this is the contractile power of the heart. According to this physician, "whenever the ventricular contractions, (as appreciated by auscultation,) are energetic, we may abstract blood fearlessly; the pulse will rise; but if the cardiac contractions be feeble, even though the pulse retain a certain force, we should abstain from depletion." In obscure cases, this suggestion should not be neglected, although the phenomenon does not possess the value attributed to it by *Laennec*; the force with which the heart contracts, depending quite as much upon the anatomical conditions pertaining to the organ, as on the general state of the vital forces. In persons affected with hypertrophy of the heart, its contractions, as well as the arterial pulsations, continue with extraordinary power, even to the moment of death; in others, on the contrary, the heart contracts feebly, although all the other indications are those of excessive vital action and demand depletion.*

Such are the principal circumstances by means of which the state of the vital forces in disease may be estimated; they cannot solve all the questions arising upon so delicate and important a point in practical medicine; but they may assist the physician in ordinary cases, a knowledge of which is the most important. It should be added, before concluding this article, that the appreciation of the forces is sometimes so difficult, that the most experienced physician is obliged to withhold his opinion, and refrain, for a time, from any active treatment, that he may not proceed at random.

E. The *intensity* of the disease is likewise a source of useful indications. Not that the same affection may require opposite treatment, according as it is severe or otherwise; but there is so great a difference between the indications in each case, in inflammation, for example, according as it is very slight or exceedingly intense, that this circumstance necessarily influences very powerfully the physician's course of treatment. In one case, cooling drinks and diet would alone be indicated; in the other, copious and frequent depletion and the most powerful revulsives should be employed.

F. The different *periods* likewise furnish various indications. The treatment of typhoid fever is unlike in its first and third

* It may not be inappropriate to mention in this connection (although perhaps more properly coming under the head, *diminution of the forces*, p. 409) the researches of Dr. Stokes upon the indications for the administration of wine in fever, which are derived from the phenomena of the heart's action. The very valuable and interesting paper which contains the account of these researches and the inferences deduced therefrom, may be found in the Dublin Medical Journal, vol. xv.—Dr. Stokes considers that *softening* of the heart exists in typhus fever, as a local disease. The important conclusion derived from the asthenic condition of the heart, &c. is as follows:—"The diminution or cessation of impulse, the proportionate diminution of both sounds, or the preponderance of the second sound, are direct and nearly certain indications for the use of wine in fever."
—TRANS.

periods, and the means which are proper at the commencement of a grave inflammation cannot be employed to the same extent in the second or third week of its duration. This rule is applicable to nearly all acute diseases, whatever may be their genus, course, or productive cause. If debilitants be indicated and evacuants required, they should be employed particularly, if not exclusively, at the outset and in the first period of the disease: they should subsequently be resorted to more cautiously, in proportion as the disease advances, without being entirely proscribed. In the last period of acute and even chronic diseases, the supervening phenomena should be attentively watched, and when the tendency of nature has been ascertained, it should be assisted if it seem proper; when sufficiently powerful in itself, we may limit our interference to the removal of every hindrance from its path, or oppose it by the most energetic means when necessary.

G. The *symptoms*, especially, supply us with indications not to be neglected. They are, it is true, merely the effects of the disease, and yield, most frequently, to the treatment it requires. But in certain cases, some of them become sufficiently severe to prove a serious addition to the danger of the primitive affection. Thus, in typhoid fever, epistaxis may supervene, sufficiently copious to endanger the patient's existence and demanding the physician's immediate and constant attention. The subjugation of the predominant symptoms is, therefore, justly regarded as an important part of the treatment, with the precaution, however, of not magnifying the phenomena at the expense of the disease, and not neglecting the main object for one of secondary consequence.*

The indications arising from the symptoms are sometimes even more important, as in cases where the diagnosis is obscure: the genus of the disease being unknown, the *symptomatic treatment* is alone admissible. We do not intend by this term, † "that erroneous symptomatic treatment, which, without rules or knowledge, opposes symptoms indifferently, but that which, enlightened and firm in its progress, at one time remedies alarming symptoms and at another manages the disease according to the indications derived from a union of all the symptoms, which render it similar to certain other affections, until it be more accurately defined." Thus, in many cases, there will frequently supervene, in an individual of good constitution and previously in excellent health, a chill, followed by general heat, redness of the cutaneous surface, full pulse, etc., and still, nothing, thus far, may clearly reveal the source of the very intense febrile action. Although the diagnosis is here obscure, the physician may, and often should, fulfil the indications presented by the symptoms, collectively considered, prescribing depletion, once or repeatedly, without waiting for local signs to inform him whether the commencing disease belongs to

* FRANK, *Epitome*, tom. i.

† Thèse déjà citée de BAYLE.

the thoracic inflammations or to some other of the nosological genera.

H. The indications derived from the *seat* of diseases demand, also, particular attention. Generally, the affected parts should be maintained in a state of perfect rest, and their position should be such that the circulation of the fluids, and especially that of the blood, be as little obstructed as possible. The sitting posture is peculiarly suitable in diseases of the head and chest; the horizontal, in abdominal affections and those of the lower limbs; the pain and swelling in paronychia and rheumatic inflammation of the hand or wrist augment when the hand is pendent, but diminish when it is elevated and rests upon a cushion; diseases of the joints generally necessitate immobility of the affected parts; those of the digestive organs demand a restricted regimen; those of the chest often require silence, as do cerebral affections, mental repose.

I. Certain indications arise from the *complications*. Occasionally, the physician disregards one of the diseases and devotes his attention solely to the other, but subsequently returns to the consideration and treatment of the former; at another time (and this is most frequently the case) the treatment is regulated according to the indications simultaneously furnished by the co-existing diseases; for example, in pneumonia complicated with peritonitis, or chronic articular rheumatism with syphilis, the indications presented by each affection may be simultaneously fulfilled.

J. The productive or developing *causes* of diseases, are highly important in regard to therapeutics, and the physician should always endeavor to discover them. *Determining* causes supply us with very reasonable indications. When a person is asphyxiated by an atmosphere filled with noxious vapor, the first indication is to remove him from its influence. When a foreign body remains in a wound, its immediate extraction is indicated. If poisonous substances have been swallowed, it will be necessary to excite emesis, if any of the poison remain in the stomach, or else it should be neutralized by the administration of appropriate antidotes, or at least, its action should be enfeebled by large draughts of liquids. If venomous secretions or virus be deposited upon any part, both the morbid agent, and the part which has received its action, should be destroyed by means of caustic. In all these cases, by removing the cause, we may hope to jugulate the disease, *sublatâ causâ, tollitur effectus*. In imaginary diseases, the treatment should be moral. A young female in the pauper hospital of Hârem, having had convulsions, many of the children at the same time in the hospital, who had witnessed these attacks, were similarly affected, the symptoms being repeated daily, by a kind of imitation, in a large number. Many remedies were unsuccessfully tried. *Boerhaave*, being consulted, directed that some furnaces filled with live coals should be placed in the middle of

the ward and iron hooks heated in order to transfix the arm of the first child who should have convulsions. This method was completely successful; no more convulsions were observed.

General *predisposing* causes, as the season, the state of the air, etc., furnish several indications, chiefly unimportant. It is otherwise in regard to climate, which in certain catarrhal affections, and some of the neuroses, has so great an influence upon the progress of the disease, that it becomes the most efficient agent in the treatment; the substitution of a warm for a cold climate has frequently been followed by an amelioration not to be obtained by any other means.

Temperament, constitution, age, sex, occupation, but especially the *habitual regimen* of patients, are the sources of indications more or less important. The sanguine temperament, for example, indicates depletion in diseases, which, in themselves, and in persons of different temperament, would not require it; the necessity for employing this means of treatment is still more urgent when the nature of the disease requires it, while in the lymphatic and nervous, blood-letting should be resorted to with great reserve, and only when its omission would be seriously injurious. This rule applies equally to individuals of naturally feeble or artificially debilitated *constitution*. What has been said of sanguineous depletion, naturally applies to the other active means of treatment, as purgatives, opium, bitter tonics and cutaneous revulsives. When about to employ these remedies, the temperament and constitution of the patients should be particularly considered.

The indications derived from the different ages are not unimportant. The diseases of children, generally considered, require more simple and fewer remedies than those of adults. The diseases of the aged, which are apt suddenly to assume an adynamic character, render greater reserve in the administration of debilitants, and a more prompt resort to tonics, necessary. Sex also has its indications, particularly in regard to pregnancy and the menstrual period, which often render it necessary to modify the use of energetic remedies, or to substitute others of less power. The occupation and place of residence also suggest indications. Certain diseases will continue so long as the affected individual pursues his occupation or retains his habitation,* because these are their productive and maintaining causes.

Ramazzini observed that country people, who labor hard, do not bear artificial evacuations so well as the inhabitants of cities, whose life is more tranquil, and whose food is also more nutritive.†—When considerable evacuations, excessive fatigue, prolonged watching, profound grief and great anxiety of mind, have preceded a disease, the latter is usually accompanied by a debility which necessitates a more prompt resort than usual to means suitable for sustaining the strength.

* See pp. 36, 43.

† RAMAZZINI, *des Maladies des Artisans*, traduction de FOURCROY, p. 451.

The physician often discovers important indications in the daily habits of life. The various disorders of the digestive organs, and many sympathetic phenomena arising from latent affections of the stomach and intestines, such as cephalalgia, somnolency, vertigo, dyspnoea and palpitations, very often depend either upon the number and proximity of the meals, (which should be separated by longer and longer intervals as man advances in years,) or upon their methodical subdivision, or else upon insufficient exercise, or finally, upon the habit of commencing study immediately after the ingestion of food, particularly if the meal have been a hearty one. These symptoms, which resist, for an indefinite period, all remedial measures, yield, as if by enchantment, to apparently very slight modifications of the daily habits, as the restriction of the number of meals to two in adult age, the establishment of a longer interval between the first and second; refraining from the use of meat and other articles of slow or difficult digestion at breakfast; a change in the hours devoted to exercise or study, so that walking exercise be taken after meals, and intellectual employments deferred for one or more hours. Nearly all students, or those obliged to devote the entire day to intellectual pursuits, should restrict themselves to a single repast, resigning almost entirely the morning meal, so that the whole day may be devoted to their occupations, and indulging their appetite at dinner, our social habits having reserved the evening for repose and relaxation.

Secondary indications alone are derived from most of the occasional causes: whether the invasion of pneumonia has been preceded by a chill, a powerful emotion, or errors in diet, no important modification of the treatment can result from these circumstances. If, however, suppression of an habitual evacuation have immediately preceded the disease, we should recall or supply it, as we should if it had been suspended long previously. If the cicatrization of an ulcer, the dessication of an issue, or the suppression of a rheumatic affection, seem to have excited the disease, rubefacients or vesicants should be applied to the previously affected surface, or an issue should be established. In like manner, chronic affections of the skin, as erysipelas or any other exanthema, should be re-established, if possible, in the part they originally occupied, by the application of a sinapism or blister, or by exciting an artificial eruption by means of croton oil or antimonial ointment. If repercussion of urticaria preceded the development of the disease, the most rational indication would be urtication of the part whence the eruption had disappeared. Suppression of the sweat most frequently furnishes no indication, except it occur during the precursory period of the disease; the latter being actually developed, diaphoresis would often be insufficient to arrest its course and might sometimes increase its violence.

K. Among the *commemorative circumstances* there is one which elucidates both therapeutics and diagnosis, and furnishes, in many

cases, particularly in chronic affections, indications of the greatest importance; we refer to the previous diseases, whose essence, whatever it may have been, might have influenced the development of the existing malady, without any revelation of its nature being made by the apparent form of that malady. Observation, indeed, daily shows us individuals, who, at different periods after *rheumatic* attacks, or one of those chronic exanthemata commonly known as *herpetic*, (*vulgairement désignés sous la dénomination commune de dartres*),* are affected with various disturbances of the economy, often transient and inconstant, sometimes fixed as to seat, but very variable in form and intensity, and most frequently simulating certain chronic phlegmasiæ or neuroses, either abdominal, thoracic or cerebral. These affections resist nearly all remedial measures, until the appearance of an exanthematous eruption or arthritic or muscular pain relieves the affected viscera from their derangements and reveals the productive and continuing cause. It would be impossible to enumerate the number of cases where this class of affections, however severe or chronic they may have been, has yielded to remedies suitable for subduing or recalling to their former position rheumatic and herpetic diseases. In disguised syphilitic affections, we ascertain the origin of the existing malady and determine its treatment by a consideration of the anterior diseases. In most chronic diseases, especially those which do not consist in those profound structural changes where therapeutics are powerless, thorough investigation of every previous occurrence and attentive examination of all the physical, moral, and intellectual conditions in which the patient is placed, will be found to afford the truest indications and those explanatory of the origin of the disease and the means of subduing it.

There are certain other *commemorative circumstances*, which, without having any influence in the development of the disease, are productive of particular indications; among these are long-continued habits. Those who, in health, are hearty eaters, and who drink large quantities of wine and spirits daily, cannot, when ill, support so severe a diet as the more temperate. A very robust man, addicted to the use of fermented liquors and accustomed to take a pint and a half of wine daily, entered La Charité, on the seventh day after an attack of pneumonia; he was only once bled, and from the succeeding day the disease declined. A man thirty-four years of age accustomed to eat three pounds of bread and the same quantity of meat, and to drink fifteen bottles of wine and four of brandy daily, contracted syphilis. M. Cullerier, when consulted by him, allowed him to take (during the *inflammatory period*) a pound and a half of bread, the same amount of meat, three bottles of wine and one of brandy.† Being convinced of the injurious effects of a sudden interruption of even the worst

* The term *dartre* has been applied to nearly every disease of the skin. (*Dunglison.*) — TRANS.

† Thèses de l'École de Paris, ann. 1809, No. 17.

habits, we published, nearly twenty-five years ago, in the *New Journal of Medicine*,* a paper upon the use of wine in the acute diseases of the intemperate. Since then, we have allowed these individuals, under such circumstances, a certain quantity of wine, either pure or mingled with other fluids (*tisanes*), and have never had occasion to regret it, having always observed death to occur in those who had been entirely deprived of wine during the disease.

There is still another commemorative circumstance that occasionally furnishes useful indications; if the patient have once, or several times, previously, had illness similar to that under treatment, we should inquire what means were then employed; if the same were resorted to in every attack and what their effect has been. If the same remedy has been always successfully employed, it should be repeated, except in certain cases where the physician's judgment forbids; if many different remedies have been tried, that most constantly productive of relief should be selected; if, on the contrary, any means which had seemed to be indicated by the kind of disease or any other circumstance have proved injurious, they should be abandoned.

Before prescribing any medicine, the physician should ascertain if the patient have taken it for any other affection, and also the effects produced, and whether he is favorably or unfavorably impressed by it. There are persons in whom opiates always act unfavorably; this idiosyncrasy (*particularité*) should be known in order that we may refrain from prescribing them. There are others who have a decided aversion to these medicines or a great dread of their effects; if necessary to resort to them, they should be disguised.

L. When a disease has continued several days, and various *remedial means* have *already been tried*, their influence upon the intensity of the symptoms may supply important indications which are of still more consequence where the genus of the disease is unknown, or in cases when the disease being understood, the treatment is doubtful. In many chronic diseases the physician relies principally upon such indications, acting, as the saying is, *à juvantibus et ledentibus*. In certain acute diseases, where the appreciation of the vital forces is difficult, the effect of the remedies first administered is exceedingly important in enabling us to ascertain their true condition and in supplying us with indications. The efficacy or insufficiency of sulphur or mercury in certain diseases, furnishes, after a certain time, new indications in regard to their continuance or suspension, etc. It should not, however, be forgotten, that the majority of acute diseases, particularly the phlegmasiæ, exhibit a continued aggravation (period of increase) for several days, notwithstanding the use of the most powerful medicines, and that, in this case, the exasperation of the symptoms, while

* *Nouveau Journal de Médecine*, tom. vii. p. 181.

restricted within certain limits, by no means proves that the remedies administered were not indicated.

M. When a disease prevails *epidemically*, certain indications arise from other circumstances: as 1st, an exact comparison of the causes and form of the existing epidemic with those observed in the preceding, may furnish indications for treating those first attacked; 2dly, when a certain number of cases has been observed, and the effect of remedies has been attentively watched, conclusions may be formed in regard to subsequent treatment. When, however, the epidemic persists, the indications may vary during its continuance, and the treatment originally successful may be insufficient or injurious toward the termination.*

N. The *tendency of a disease* to different terminations requires also the physician's attention. If the termination is likely to be favorable, his care may be employed in the simple removal of all aggravating circumstances, or in fulfilling the secondary indications already existing or subsequently supervening, and all active medication may be abandoned, except the disease continue a long time and there be no therapeutical means capable of suspending or abridging its duration. — If there be a tendency to a fatal termination, the most energetic means for its prevention should be tried; but when death is inevitable, the indications are restricted to treating the principal symptoms, with the intention of prolonging life or rendering its last moments less painful. — If the disease neither increase nor diminish, as in paralysis, the *perturbing treatment* is generally resorted to; this consists in the employment of remedies likely to produce a powerful diversive effect: this treatment, however, would be dangerous, if the disease, which is really stationary, were of a nature liable to be exasperated by its employment: in certain cases of mammary cancer, for example, great care should be taken not to employ active remedies when the disease is stationary, because all change must necessarily be injurious. — In certain acute diseases which may terminate in death or the return to health, active treatment should be employed if the indications be decided; the opposite, if they be obscure: perturbing treatment would not be proper, for example, in all the forms of adynamic typhoid fever. These affections, notwithstanding the apparent disorder frequently accompanying them, are not, more than other diseases, a state of confusion, but rather a sort of struggle between vitality and the causes which have disturbed its harmonious action, — a struggle whose issue is doubtful. In this state of uncertainty, should we indiscriminately and in every case endeavor to disturb the course of these diseases, or merely confine ourselves to meeting the precise indications that may be presented? We unhesitatingly advocate the latter course.

* RAMAZZINI, *Epidem. mutin.*, ann. 1691, in SYDENHAMI *Oper.* tom. ii. p. 38. Geneva, 1736.

O. The *influence* which may be exerted by the disease upon the patient's *constitution* and upon previous affections is also of service to the physician. If the disease disturb the functions of the organs remote from its apparent seat, and particularly of the locomotive and digestive apparatus, or if it aggravate pre-existing affections, its course should be arrested as speedily as possible. If, on the contrary, the appetite and digestion improve after the appearance of a cutaneous eruption or an attack of intermittent fever; if the individual perceive an increase of strength, if certain uncomfortable sensations, long experienced, cease completely, etc., the progress of the disease should not be interrupted, all opposing influences should be removed, and if anything suddenly arrest it, it should, if possible, be reproduced. In proportion as its course is favorable, the remedy will be unfavorable, *morbi boni, remedia mala*.* There are, then, diseases which it is dangerous to cure, as is proved by the collection of observations published upon this important point in therapeutics:† their number, however, is not very large, and the dissertation of Werthoff, *De limitandâ febris laude*, need not now be read in order to establish the truth of the assertion. We must refer to the period when this work was written, to avoid being astonished that any one should have seriously endeavored to establish such a proposition.

Such are the principal circumstances from which indications for treatment are derived. They are not all equally important; but none of them can be neglected without detriment. It is evident from the above considerations, how erroneous is the opinion of those who believe that there is a remedy for every disease, and how different, a treatment founded upon experience, from empiricism; the modifications of treatment are also manifest that are founded upon the numerous indications which combine and form, as it were, out of every disease, an affection dissimilar, in some respects, both as to treatment and symptoms, from all those that most resemble it. It is not, as has been judiciously remarked, *dropsy* or *peripneumonia*, simply, that is treated, but those diseases as manifested in various individuals, of different ages, sex, temperament, habits, etc.‡ The great number of circumstances, which should all be considered and their value appreciated in order to perceive the indications, causes the difficulty experienced in the detection of the latter.

There are but few cases in which a single indication only is manifest; in nearly all diseases there are many. These simultaneous indications may be analogous and concur in the same object, as general bleeding, abstinence and topical emollients, all of which should be combined in certain inflammations. But this is not always the case, and sometimes, while certain circumstances indi-

* WERTHOFF, *Dissert. de limitandâ febris laude*. Opera. tom. ii.

† *Traité des Maladies qu'il est dangereux de guérir*, par Dom. Raymond.

‡ *Nec pneumoniam generatim, nec hydropem curamus, sed pneumoniam Sempronii aut Tulliae, sexu, ætate, victus genere, aut temperamento differentium*.—SPRENGEL, *Pathol. general*. p. 72.

cate one sort of treatment, others oppose its application. These opposite indications are called *counter indications*. In typhoid pneumonia there exists, on the one hand, an inflammation requiring debilitating treatment, and on the other, a depression of the vital powers demanding entirely different remedies. It cannot be disguised that these cases are very embarrassing: if the inflammation be combatted, the debility is increased; if tonics be employed, the inflammatory symptoms are likely to become exasperated. In such an emergency matured tact is requisite for the accurate appreciation of the relative value of the opposing indications, meeting the most urgent as completely as possible, taking care that the means employed be favorable to one of the morbid conditions without aggravating the other, or that the evils arising from the use of certain remedies may be more than counterbalanced by their beneficial action.

Embarrassment in regard to the treatment of a disease may occur from other causes than the existence of counter indications. It sometimes happens that an acute or chronic disease exhibits more or less serious symptoms without furnishing any decided indication. Should active means be tried in these cases, and a species of instinct be obeyed which would lead us to suspect certain indications of which we are doubtful? Some practitioners pursue such a course, but we should be unwilling either to adopt or advise it: we act blindly when destitute of positive indications. The judicious reserve of *Sydenham* and *Morgagni* may be fearlessly imitated in such circumstances, while an opposite course would often be regretted. "I need not blush to confess," says the former, "that in the management of fevers, I have many times congratulated myself upon refraining from action when nothing manifestly furnished indications of treatment: while thus attentively watching the course of the disease, in order to seize the favorable moment for attack, the fever either vanished spontaneously, or assumed a form which indicated the remedies to be employed."* "In certain chronic diseases of doubtful nature," says *Morgagni*, "we should not proceed rashly, but restrict ourselves to the employment of remedies sanctioned by experience, which, while incapable of inflicting injury, generally relieve to a certain extent."† Utility is only the second rule of therapeutics; the first is avoidance of injury.

We do not, however, mean to imply, that in acute or chronic diseases, the physician should constantly abstain from all active treatment, because the indications are obscure; but the greatest circumspection is requisite in its employment. For this reason

* *Neque pudet fateri, me non semel in curandis febribus, ubi nondum constaret quid mihi agendum esset, nihil prorsus agendo et mihi et agro consuluisse optime; dum enim morbo incigilarem, quo eum opportunius confodere valerem, febris vel sponte sua sensim evanuit, vel in eum se typum redegit, ut jam mihi innotesceret quibus armis esset debellanda* — (SYDENHAM, tom. viii. p. 158.)

† *Temerè nihil audendum, sed iis quæ levaminis aliquid afferre hactenus consuescunt, innoxius remediis utendum.* — *De Sedibus et Causis Morbor.* lxiv. 5.

cinchona is cautiously tried in certain affections resembling intermittent fever, and mercury employed in those suspected to be of syphilitic origin. These remedies become in such cases a sort of *touchstone*.

There have existed physicians in all ages, who have been distinguished either by a dangerous predilection or an antipathy nearly as blameable for certain indications. Some have seen, in every disease, indications for depletion and emesis; others always purged their patients without exception, either during the course of the disease or subsequently; or else administered tonics indiscriminately. Others, adopting the opposite extreme, asserted that such indications never existed, and that blood-letting, cinchona and purgatives were always injurious. We shall not attempt to prove how erroneous and dangerous are these opinions; their mention alone is sufficient for their reciprocal destruction. There is no remedy of unfailing utility, nor any which is constantly injurious; this is so evident that we should not have noticed it, had not these exclusive, we might say absurd, opinions received the sanction of celebrated names.

The aim of medical treatment is not merely to combat the existing disease; it should be also directed, either to the prevention of those maladies that threaten the healthy, or to hastening the re-establishment of the functions in the convalescent: there are *prophylactic** or *preservative indications*, and also those of *convalescence* and the *consecutive phenomena of diseases*.

Preservative indications occur in various circumstances. 1. The offspring of parents affected by hereditary disease, should be subjected to treatment suitable for modifying this unfortunate predisposition to its transmission. 2. When the precursory signs of a given disease are observed in any person, they furnish a prophylactic indication which it is sometimes very necessary to fulfil, as, for example, in threatened apoplexy. 3. An individual who has been once, or more frequently affected with a disease of frequent recurrence, as rheumatism, gout, etc., should take the appropriate measures to prevent its return. 4. If a disease prevail epidemically, various prophylactic indications arise, from its form, causes, etc.: they are founded, in all these cases, upon ordinary therapeutical bases. 5. When contagious disease appears in any place, there is a peculiar indication for the preservation of those who cannot escape the danger of its contraction by flight; this is, forbidding all communication, direct or indirect, with the patients. In this way the Orphan Asylum of Moscow was preserved† from the plague which desolated that city, and the Hottentots thus sheltered themselves from variola brought to the Cape of Good Hope by a European vessel; thus, also, during many pestilential diseases, certain cities, or particular quarters of them, or a number of houses, have been kept from the contagion. The same may be

* Προφυλάσσει, I anticipate: from φυλάσσει, I guard; and προ, in advance.

† MERTENS, tom. i. p. 203. — MEAD, *Opera*, p. 306.

said, in like cases, of the peculiar individual indications for those who, from their profession or duties, are obliged to visit or remain with the sick. 6. When a disease prevails or reappears endemically in any place, it gives rise to indications of another kind. If neighboring marshy grounds occasion intermittent fever every autumn, it will be necessary to drain the marsh, or to surround it with a perpendicular enclosure, or, what is preferable, to convert the stagnant water into a continual stream. The fetid and corrupted water of a river caused devastating disease throughout an entire province; *Empédocles* increased the rapidity of its current by connecting with it two other rivers; the diseases never reappeared.

In *convalescence*, the principal indications are gradually to re-establish the strength by suitable regimen, considering the patient's general debility, and that of the digestive organs particularly: by regimen we mean, not only the choice and quantity of food, but also everything connected with those general attentions by which the convalescent should be surrounded. — When there is a tendency to reproduction of the disease, as is the case in intermittent fevers, it is often necessary and always useful to prolong the use of a successful medication during a portion of convalescence.

For a long period, purgation of all convalescents was considered a therapeutical axiom. This practice, which was not unattended with danger, has now become obsolete; but, as too frequently happens, the opposite extreme was adopted, and the absolute prescription of purgatives in convalescence is not without its objections. The prudent physician will adopt neither of these exclusive rules; he fulfils an evident indication for purging when it exists in convalescence, but declines such procedure in opposite circumstances.*

The indications derived from *consecutive phenomena* vary according to the previous diseases and the phenomena themselves. In such cases, the physician must not lose sight of the state of debility in which the previous disease has left the convalescent, nor of the danger of relapse. Both these considerations should be weighed, when the most appropriate treatment for the consecutive phenomena is desired.

Having enumerated the principal sources from which indications arise, we shall glance at the means employed for their fulfilment.

ARTICLE SECOND.

Therapeutical Means.

THE general term, therapeutical means, comprises all that may be employed by the physician for the restoration of health. Air,

* “*Nec reconvalescens omnis aut tàm sollicitè, aut tàm parcè nutriendus, aut alvo purgandus, aut demùm roborandus. sed sua cuius morbo, subjecto, ætati, etc., reconvalescencia est, quæ dietam sibi propriam et medicamenta interna, externa, aut varia, aut nulla sibi exposcat.*” — FRANK, *Epitome*, i. 35.

habitation, regimen, abstinence, exercise, amusements, etc., are therapeutical means equally with remedies, properly so called.

From the above enumeration we readily perceive that they are almost infinite. All natural bodies, every artificial combination, every vital act, even, become appropriate means for the fulfilment of indications. We shall not consider them in detail, but only in a general manner. With this intention we shall divide them into two classes: in the first, we shall place therapeutical means properly so called; in the second, general or *hygienic* means.

SECTION FIRST.

Therapeutical Means, properly so called.

Therapeutical means proper, differ from hygienic means, by reason of the latter being equally applicable to the healthy and the diseased individual, and tending alike to preserve health and oppose disease, while the former are particularly directed to the treatment of the disease, and are applicable only to those affected or threatened by it. They have been divided into external or surgical, and into internal or medicinal.

§ I. Surgical or external means have been described in various series: in the first, are enumerated those which act *synthetically*,* that is, by the union of divided parts, or the restoration of those which are displaced: such are uniting bandages and agglutinative plaster for wounds, splints for fracture, taxis in hernia, etc. In the second series (*diæresis*),† are included all those operations that consist in the division of entire parts by means of the hand, the knife or caustics: all incisions, from simple phlebotomy to gastrotomy, appertain to diæresis. In the third series (*exæresis*)‡ are united all the methods employed for the extraction of foreign bodies or injurious substances: the extraction of urinary calculi, and the destruction of poisoned or envenomed parts by caustics, belong to this series. The fourth series (*prothesis*)§ includes all the mechanical appliances intended to supply the place of missing or deformed parts. This division of the surgical, is no more exempt from imperfections than that of the medical, means. The same operation sometimes necessitates the concurrence of means from each of these four series, and the most simple operations frequently require the aid of several: || in the operation for strangulated hernia, for example, there is division,

* Θεω, τίθημι, I place; σύν, with.

† Αἰσπείω, I divide.

‡ Ἔξ, from; αἶρω, I draw.

§ Θεω, τίθημι, I substitute; πρὸς, instead of.

|| *Traité des Maladies chirurgicales et des Opérations qui leur conviennent*, par BOYER. Paris, 1814 - 1816.

reduction, application of a bandage in order to remedy the weakness of the abdominal parietes, and occasionally removal of a portion of gangrenous epiploon or intestine.

§ II. The means belonging to internal pathology are yet more insusceptible of methodical classification. None of the divisions hitherto proposed has met with universal acceptance. The old division of remedies into evacuants and alterants is entirely abandoned at the present day, and those which have been substituted are hardly more satisfactory.

Remedies should be classed wholly by their action upon the economy: this action being nearly always complex, often variable, and sometimes, in entire opposition to the intended effect, in certain individuals and diseases, the difficulty of making a regular division is apparent: on this account, we are obliged to class remedies rather according to the intention with which they are employed than by their effects. The principal intentions in the administration of remedies are to increase or diminish the evacuations, to augment or reduce the strength, to calm or stimulate, and to oppose diseases by those specifics whose action tends to arrest their progress: we may thus divide nearly all remedies into seven principal classes, viz., *evacuants* and *astringents*, *debilitants* and *tonics*, *sedatives* and *stimulants*, and, lastly, *specifics*. We are the first to perceive the defects of this classification, but we think they exist in all others, which have the additional inconvenience of far greater complication. The evacuants, it is true, do not always produce evacuations, and astringents sometimes increase them; substances of reputed debilitating influence may occasionally augment the strength; we are aware that sedatives, and particularly opium, have sometimes caused actual stimulation, and that properly speaking, there are no *specifics*; but if, as has been very judiciously observed, *the positive* is found only in the human imagination, and exists nowhere in the acts of nature, we cannot require its presence in the object now under consideration,* and even numerous exceptions should not prevent us from considering, in a general manner, the potassio-tartrate of antimony as emetic, blood-letting as debilitating, opium as sedative, ammonia as stimulating, cinchona and mercury as specifics† in the treatment of intermittent fever and venereal diseases.

* The majority of remedies display a complex action, and may, for this reason, be divided into several classes. Purgatives are debilitating and evacuant; cinchona is tonic and febrifuge; some of the diuretics are stimulant and even tonic, etc. This inconvenience is inherent in the subject, and is found in all classifications.

† The number of specific remedies is very small; mercury, cinchona and sulphur are the only ones deserving this appellation; vaccinia may be added, whose effect is only preservative. There can be no specific remedies, except for diseases arising exclusively from specific causes: syphilis, scabies, variola and intermittent fever are, thus far, the only affections for which specific remedies are known: it may be considered certain, that if new specifics are hereafter discovered, they will be applicable to affections produced by specific causes, such as rabies, scarlatina

We have previously shown, (while explaining the rules which should guide the physician in experimentation,) how delicate and difficult is the appreciation of therapeutical means; we insisted upon the necessity of not prescribing, in the majority of cases, but one remedy at a time. Medication was entirely different in the times preceding our own. Physicians thought it indispensable to encumber their prescriptions with a crowd of ingredients, even when the disease required no medicine; a draught which did not contain at least five ingredients would have been faulty in its composition, and the prescriber would have been accused of ignorance, or at least of carelessness. Time has shown the absurdity of such medication, and polypharmacy* has but a few interested or credulous proselytes, whose number diminishes daily. Medical men are not alone in condemning this practice; the public perceive how useless and ridiculous are these monstrous combinations of all kinds of drugs, which often endanger the patient's life, and essentially impede the progress of our art.

This great reform in practical medicine, to which the genius of Pinel so powerfully contributed, has already been productive of excellent results, and promises infinite advantages to the profession. In most cases, it is by the employment of only a single remedy at

and rubeola. Epilepsy, on the contrary, which depends upon various causes, can never have a specific remedy. — [Why may not *iodine* be considered a specific in the treatment of *bronchocele*? Although not holding the same rank with mercury and cinchona in regard to specific action, there seems sufficient evidence of its efficacy in this disease to give it a claim to the above title. — Pereira distinctly applies the term; mentioning the uses of iodine, and comparing its therapeutical influence with that of mercury, he says, "Iodine evinces a *specific* influence over the diseases of certain organs (*e. g.* the thyroid body,) which mercury does not." And he subsequently adds, "Of all the remedies yet proposed for bronchocele, this has been by far the most successful. Indeed, judging only from the numerous cases cured by it, and which have been published, we should almost infer that it was a *sovereign remedy*." — (*Mat. Med. and Therap.* vol. i. p. 228, Amer. edit.) Dr. Copland, (*Med. Dict.* — cited by Pereira,) remarks that of several cases treated by him, "there has not been one which has not either been cured or remarkably relieved by it." Bayle (*Bibliothèque de Thérapeutique*, tom. i. p. 394,) gives a summary from several authors; out of 364 cases treated by iodine, 274 were cured. — Trousseau and Pidoux, after noticing the extraordinary success obtained by Coindet in bronchocele, by the use of iodine, (cure in two thirds of the cases) proceed to explain the probable reasons why the remedy often fails; they consider it to be chiefly owing to the modifications in the form of the disease. The simple goitre, which is only an hypertrophy of the thyroid gland, disappears readily under the influence of iodine, which will naturally have less effect where there is degeneration of the tissue of the glands, such as the scirrhus, encephaloid, tuberculous, osseous, tophaceous, cartilaginous and encysted formations, sometimes noticed. These considerations are also suggested by Pereira, (*Op. cit.* p. 229,) Trousseau and Pidoux mention the curious fact of the cure of goitre being accomplished by the simple removal from the region where it was contracted to countries where it is not endemic (*L'Eveillé, Eymery, Fodéré, Itard*), without any remedy being administered. (*Traité de Thérapeutique et de Matière Médicale*, tom. i. p. 267.) — The failure of iodine in cases complicated by the above degeneration of the glandular texture is no more surprising than that of mercury under like circumstances in its own peculiar province. We cannot see why the title *specific* may not be appropriately applied to iodine.] — TRANS.

* Polypharmacy; *πολύς*, many; *φάρμακον*, a remedy.

once that we can properly appreciate its effects upon the system, and consequently dispel some of the darkness which still surrounds the most important branch of medicine. While we condemn the simultaneous employment of a large number of remedies, we mean those only of an *active* character, for others may be combined without risk of injury, in accordance with the taste and even the caprices of the patient: the simultaneous or alternate administration of an infusion of violet flowers or of mallows, of anchusa officinalis, or of mullein leaves, is to employ several remedies, but the treatment is not thereby changed, the action of all these means being not sensibly different.* There are cases also where it is necessary to combine several active remedies, as depletion and emetics, cinchona, wine and blisters; but when the severity and pertinacity of the disease do not require it, one remedy at a time is preferable.

The indications not being the same throughout the whole course of a disease, it is generally necessary to change the medication. Tonics may be indicated in the latter period while depletion was required at the commencement; but these alterations should be gradual, and it hardly ever happens that opposite remedies are indicated upon alternate days. Thus, in grave fever supervening in a young man, the inflammatory symptoms manifested at its commencement require debilitants, particularly blood-letting; later in the disease, weakness no longer admits of bleeding; still later, the employment of some slight tonic is indicated, which is administered in small doses, and only during the remission; the dose may be increased daily and given at shorter intervals; finally, when the adynamic symptoms are fully established, and particularly, when there is diminution of heat and slow pulse, the most energetic tonic remedies should be employed, as extract of cinchona, camphor, generous wines, etc. In this case, the means employed at the commencement and at the termination of the same disease are in complete opposition; but the treatment cannot be questioned, because there is the same change in the phenomena of the disease. Far different would be the case, if the physician, constantly fluctuating in his opinion upon the nature of the affection, and imagining opposite indications every little while, in the same disease, should each day lay aside the prescriptions of the previous evening, and resume those he had once before abandoned. However various may be the forms of disease, no excuse can be thence derived for such vacillation, which always indicates, in the physician, unequivocal want of experience or indecision.

The number of remedies being infinite and that of the indications limited, it results that each of the latter may be fulfilled by various remedies, from which the preferable one should be selected

* As Bayle has remarked, the *treatment* should not be confounded with the *remedy*. Treatment is not the employment of a certain remedy in a given disease, but the method of combating that disease, by fulfilling, in the manner considered most proper, a certain indication. Remedies may vary according to situation, the age in which we live, and even *fashion*, and yet the treatment be the same.

and administered in forms and doses varying according to a multitude of circumstances, and consequently incapable of previous determination. Therapeutics are less susceptible of mathematical precision in this respect, than all the other branches of medicine. When blood-letting is indicated, for instance, it is impossible that all physicians should be able to declare the number of times that it will be practised, and the precise quantity of blood that will be drawn. In a disease where one would prescribe infusion of cinchona, another will prefer the decoction, powder, or extract; one will use serpentaria in a case where another will order angelica or cascarilla; all, however, will pursue the same treatment and perceive the same indication; the only difference will be in the mode of its fulfilment.

The forms in which medicines are administered are extremely various. Some are given in the solid state, others in the form of gas, or of vapor, but the majority are liquid. They are sometimes applied externally; most frequently, however, they are introduced into the interior of the body, and particularly into the digestive canal, whence they are absorbed into the system.

Certain medicaments are exhibited singly, others in a state of combination with different substances, which at one time augment or modify their action, at another merely serve as their vehicle. The preparation and preservation of medicines are the peculiar province of *pharmacy*.*

The dose of medicines must be regulated by the energy of the active principles they contain, also by the proportion of those principles, which sometimes varies,† the patient's age and susceptibility, the kind of disease, and the effect desired; it should also vary relatively to the time during which the medicine has been administered; habit diminishes the power of medicines, as it does that of morbid causes, and it is necessary, after a certain time, to increase the doses, by a methodical progression, to change their mode of preparation, or even to resort to other remedies, when several will fulfil, equally well, the same indication.

SECTION SECOND.

General or Hygienic Means.

Hygiene‡ is that branch of medicine whose purpose is the preservation of health and the prevention of disease. Whatever conduces to this double result may be classed with hygienic means.

If hygiene may be termed the medicine of the healthy, hygienic

* Φάρμακον, a medicine.

† A mass of opium, or a portion of extract of nux vomica, may differ so much in this respect, that the same dose, taken from the new specimen, shall produce toxical symptoms.

‡ Ὑγίεια, health.

means are as applicable and necessary to the diseased as to those in health; the latter may, sometimes, dispense with them with impunity; the former cannot.

Not only are hygienic means very useful in diseases, but even more so than any medicines, properly so termed. The efficacy of many remedies may be doubtful, that of hygienic means cannot be contested. By their aid alone, without medication, the majority of acute diseases may terminate favorably; without their concurrence the most clearly indicated medicines will always be insufficient; this is not mere conjecture, but a truth confirmed by the past and present observation of innumerable facts. In places where there are no physicians, and where, consequently, there is little, or, as too frequently happens, unsuitable medication, nature, assisted by the hygienic means that good sense suggests, in the majority of cases not only conquers the disease, but overcomes also the aggravating influence of improper remedies. In entirely different circumstances, where the patients have medicine and skilful physicians to administer it, but are in bad hygienic conditions, severe diseases terminate in death, almost without exception, and those even originally far less dangerous, become fatal. The crowding of patients in confined and ill-ventilated apartments, bad air, entire want of cleanliness, destitution of linen and outer garments, exposure to cold and rain, errors in diet, and depression of spirits, have constantly produced the above fatal effect whenever their influence has been conjointly manifested; while in a multitude of acute affections, as variola discreta and regular typhus, a cure has been effected solely by the aid of general or hygienic means, no active remedy having been employed.

We have previously pointed out the necessity of administering active remedies singly, or at least, in small number at one time. The contrary is the rule with hygienic means; it is, we may say, impossible to combine too many of them in the treatment of both acute and chronic diseases.

These means, although not precisely similar in all diseases, are analogous in the majority, both of the acute and chronic form, which enables us to give a brief statement of them, as constituting a very important point in general therapeutics.

§ I. *General Means in Acute Diseases.*

A. *Circumfusa.*—In acute diseases, patients should occupy an apartment of sufficient size to avoid deterioration of the air, and having several openings, so that its renewal may be easily effected.—The temperature of the room should be mild; during summer it may be lowered by excluding the solar light, or by aqueous aspersion; in cold weather it should be elevated by means of fires.—In winter, a westerly and southern exposure is the best; a northern and easterly one in summer. The temperature should vary also with the nature of the disease and the state

of the animal heat in the patient. A dim light is proper in diseases characterized by augmented vital action; where the latter is diminished, a bright light is preferable. When the air of the patient's room has become foul, when the exhalations or excretions are fetid, and especially when the affection from which he suffers is contagious, his own interest, as well as that of the assistants, demands his removal, if possible, to a larger apartment, frequent renewal of the air by opening the windows, the use of ventilators, or aromatic fumigations, which, if they do not destroy the contagious principles, at any rate communicate a stimulating property to the air which the patient breathes. Great importance has been attached, for several years, to fumigations with chlorine, for the destruction of miasmata and virus; but since M. Bousquet, by repeated trials, has proved that the addition of chloride of soda to vaccine matter did not in the least change the contagious property of the latter, chlorine has necessarily lost much of the reputation for special action attributed to it by chemical theories.*

If the patient be in a small, damp chamber, or in one used in common with him by several others, he should be removed, when a more suitable place can be provided, notwithstanding the seeming difficulties of transportation. Numerous examples prove, that individuals very dangerously ill have been removed from hospitals and carried a long distance, not only without aggravation of the disease, but with an amendment daily more decided: the observations of *Lind*, in particular, support this assertion.

B. *Applicata*.—The most scrupulous attention to cleanliness is absolutely necessary for those laboring under acute disease; the linen, therefore, should be frequently changed. This principle, generally admitted at the present day, was long misunderstood; and strange to say, in eruptive and contagious fevers, variola particularly, where the linen is constantly soiled with pus, and consequently requires to be more frequently changed, the contrary was most strenuously advised. There is no risk in changing the linen, provided it be not too often repeated and fatigue be not induced: it may even be done, with proper precautions, during perspiration,† when chills are usually apprehended.

* Fumigations with chlorine are, however, spoken of in the most commendatory terms by the best authorities; the disinfecting property it possesses is of so great service and such universal application, that it must necessarily always be appreciated. Thomson styles it the most efficacious means of fumigation. (*Management of the Sick Room*, p. 275, Amer. Edit.) Pereira says, “as a fumigating agent, disinfectant, and antiseptic, chlorine, I believe, stands unrivalled.” (*Mat. Med. and Therap*, vol. i. p. 219, Amer. Edit.) The appearance of epidemic cholera or yellow fever, notwithstanding its profuse employment, (as mentioned by Trousseau and Pidoux; — *Therapeut.*, etc., art. *Cholere*.) hardly prove, as these authors assert, its utility in epidemics: can we declare that the diseases would not have spread more widely or have caused greater mortality, if it had not been used? These authors do not, of course, deny its disinfecting qualities. — *TRANS*.

† These precautions consist in passing very warm napkins beneath the moist-

Beds used by the sick require a certain degree of attention. The wool mattress is most commonly employed; one filled with hair would be preferable in hot weather, for those affected with nephritis, hæmorrhage, or sanguineous congestion of the pelvic viscera: patients should never be allowed to lie upon feather beds. It will often be necessary to protect the bed, either with substances suitable for the reception of the excretions, or by means of cloth impermeable by fluids; * cushions are sometimes needed, so arranged as to relieve certain parts from injurious pressure. The arrangement and position of the bed should conform to the circumstances of the disease: if constant dorsal decubitus be requisite, the bed should be on a horizontal plane; in those affected or threatened with cerebral congestion, it should be so inclined that the head may be much higher than the rest of the body. Many kinds of mechanical beds have been invented, for the purpose of elevating the body, removing pressure from certain parts, or passing a bed-pan more readily beneath the patient, etc.; these beds are particularly useful in fractures of the lower limbs.

The application of hot napkins over the whole body or to particular regions, in cases of general or partial chill, and the use of globes or tin vessels containing hot water, etc., should also be classed among the general means.

C. *Ingesta*.—The use of food and drinks is highly important in acute diseases. There are two inconveniences, equally great, that should both be carefully avoided, viz., too abundant and too restricted nourishment. *Ramazzini* said very justly, that the poor often died from repletion, when ill, and the rich from the effects of the too severe diet to which they were restricted. *Hippocrates* thought it less dangerous to slightly exceed the necessary amount of nourishment, than to enjoin too strict abstinence. The proper medium should be sought for, in acute disease, all solid food being proscribed, but allowing, (when febrile action is not very intense and the patient expresses a desire for them,) slightly nutritious drinks, as veal, chicken or frog broth, and even certain ripe fruits, a few grapes or some slices of orange, of which the juice only should be swallowed; but during the period of violence, (chap. viii. p. 235,) the diet should be more restricted, and, most

ened body linen, in which the legs, thighs, abdomen, chest, and even the neck, should be successively enveloped, so that when the moist linen is removed in order that dry may be substituted, the patient may be completely covered by the warm and dry clothes: the arms alone are momentarily exposed to the air; but the rest of the body is protected.

* The great degree of perfection attained in the fabrication of caoutchouc, has proved a source not only of *convenience* but of great *comfort* to the healthy as well as the sick: the variety of uses to which it is now applied is almost infinite; from beds, pillows, cushions, and portable baths, down to far more minute and fanciful articles, it is seemingly well adapted to all. In surgery and practical midwifery, for the sake of cleanliness alone, it is highly valuable; also in irrigation of different parts of the body, for the purpose of protecting the bed-linen, etc.—TRANS.

frequently, complete abstinence should be enjoined; "the unseasonable ingestion of food," remarks a celebrated physician, "nourishes the disease and not the patient." During the period of decline, its use should be gradually resumed.

D. *Excreta*.—The immediate removal of excreted matters from the sick room and from the patient's body, is of the greatest importance during acute disease: the perspiration, when it cools upon the body, is highly injurious; the urine and fæces, already modified by the disease and liable to rapid putrefaction, communicate noxious properties to the air; matters which are vomited excite retching both by their appearance and odor. When the urine and fæces are excreted involuntarily, still worse results may follow their contact with the patient's body: they may be absorbed by the skin, or may rapidly determine either a pustular eruption or excoriation of the sacral integuments, and excite the formation of eschars, which are always dangerous and often fatal.

E. *Acta*.—Rest and nearly constant confinement to bed is generally advised in acute diseases: patients are benefitted, however, by daily removal from one bed to another, or by being seated in an armchair, according to their strength, where they may remain until fatigue or uncomfortable sensations oblige them to resume their former position. *Sydenham* advised that patients should be removed from bed daily; he considered this a preventive of, and a remedy for, delirium. We have previously seen that passive exercise, and even transportation for a long distance, was beneficial to fever-patients: it is possible that this means, (whose beneficial effects have been frequently proved by chance or necessity,) may have been too generally neglected.

The position of patients too feeble to move without assistance, should be frequently changed; negligence in this respect almost necessarily induces the formation of eschars upon parts exposed to compression, and all their disastrous consequences.

Sleep is generally favorable in acute diseases: consequently, everything likely to act powerfully upon the patient's mind or senses, and thereby prevent it, should be avoided: for the same reason, sleep should not be interrupted needlessly, either for the administration of remedies or any other purpose, except it have been very prolonged, or there be urgent necessity for taking medicine. When sleep does not take place naturally, it may sometimes be induced, by raising the patient for a few moments and arranging his bed before replacing him; when this is insufficient, if there be no counter indication, a soporific may be prescribed.

F. *Percepta*.—The sensations, moral affections and intellectual functions demand the special attention of the physician. We have seen in what cases the presence of light is favorable or prejudicial: noises, and particularly all sorts of conversation, are nearly always injurious in the sick room: whispering often causes apprehension

in the patient ; loud talking fatigues him. Strong and penetrating odors are generally dangerous in inflammatory diseases, but may be serviceable in adynamic affections and certain neuroses.

The influence of the passions upon the progress of diseases is so powerful, that nothing, which will give them a favorable direction, should be neglected. For this reason the physician should put in requisition all proper means for securing and retaining the patient's entire confidence, and be on his guard continually that nothing in his conversation or actions impair it. By listening to him very attentively, and expressing a particular interest in his case, the first object may be attained. Whatever may be his opinion as to the result of the disease, a favorable prognosis should always be given in presence of the patient ; he should be accosted confidently, and calmness maintained while with him, even where there is every reason to apprehend the greatest danger ; no inconsiderate word, no unguarded gesture, no alteration of countenance should lead the patient to suspect, in the least, the peril by which he is threatened. Those who remain with him should be advised to show no anxiety whatever ; and, for this reason, the extent of the danger should not be disclosed to those who might not have the resolution or intelligence requisite for concealing it. There are patients who constantly urge their physician to tell them whether they are in danger, protesting that they have no fear of death ; but this very assertion, and particularly their eagerness to know the probable termination of their disease, proves that they are far from being resigned : the physician should be on his guard against these importunities. Men who have been accustomed to brave death under circumstances where they could perish gloriously, have been observed to quail at the idea of the danger which threatened them in sickness, and to lose all courage when their inevitable death was announced. A truly philosophical, and still more, a religious spirit, may impart to some, the firmness necessary for receiving with calmness the announcement of their approaching death ; but these few exceptions do not destroy the common rule : the fear of death generally adds to the gravity of serious disease, and the physician who permits a patient to suspect the danger of his position, lessens the chances of cure. He who announces to a patient that his disease is necessarily fatal, will be compelled to reproach himself not only for shortening the life which he should have endeavored to prolong, but also for bringing affliction and despair to those whom he should console and encourage.

All mental excitement is injurious in acute affections : patients should consequently be restrained, if necessary, from exposing themselves to its effects ; most frequently, however, they have neither the wish nor the power to do so, and it will suffice for the fulfilment of this indication, to recommend those in communication with them to say nothing in their presence which might excite serious reflection or profound meditation.

§ II. *General Means in Chronic Diseases.*

Hygienic means are quite as useful in chronic as in acute diseases. Change of habitation and of climate, travel by land and sea, frictions, cold and warm bathing, the form and texture of the garments, the number of meals and the intervals between them, the choice and quantity of food and drinks, active and passive exercise, walking, running, equitation and amusements of every description, are the principal hygienic means recommended, with peculiar modifications, in the course of chronic diseases: in very many such affections, their action is infinitely superior to that of medication in the usual acceptation of the term. In nervous affections particularly, especially those dependent upon moral causes, in those various derangements of the digestive organs, so frequently occurring, and so long and improperly confounded under the common denomination of gastritis, what numberless resources are found by the physician in the methodical employment of hygienic means, and particularly in a more proper distribution of the time allotted to mental and physical exercise, in a greater regularity of the meals, and in that thorough change of all the habits effected by journeys or residence in a different climate. The patient who passes the winter in a warm climate, finds other circumstances favorable to health, besides the mere amelioration of the atmosphere: his hygienic condition becomes totally different. If, for example, he leaves Paris for Pau, Hieres or Pisa, he not only enjoys a milder climate, but the air differs in many other respects from that he habitually respire; his food and drinks will be of different quality; his secretions will be modified; his hours for taking food, for sleep and waking will be changed; his walks, his physical and intellectual occupations, society and thoughts will be unlike those to which he has been accustomed; his clothing, even, will undergo slight modifications; in short, a thousand new influences will affect him, and concur in modifying the organism in a way difficult to describe, but sure in its results.

We commenced this chapter by glancing hastily at the foundations of therapeutical science; examining afterwards the indications and the means for their fulfilment. It has been shown that indications were not always evident; but that, notwithstanding this, inaction was inadmissible in cases where the disease made daily progress. In these difficult circumstances, it is the physician's duty, after having collected all the facts that can yield him any information, and compared the case submitted to his care with similar or analogous cases supplied by his own recollection or the annals of the science, to treat his patient as he would wish to be treated himself, if similarly affected. It was this favorite maxim of *Sydenham*, which sustained him in the arduous as well as hon-

orable duties of his profession : "*Ægrorum nemo à me aliàs tractatus est, quàm egomet tractari cuperem, si mihi ex iisdem morbis ærotare contingeret.*"* — M.

CHAPTER XX.

NATURE OF DISEASE.

HAVING successively considered each of the principal subjects within the domain of general pathology, confining ourselves as far as possible to the positive part of this science, we feel constrained, if not to consider in its whole extent, at least to take a brief survey of its hypotheticalal portion, that we may become convinced of the total inefficacy of our own powers in guiding us through this labyrinth, and thus bringing us to a knowledge of the truth.

We shall first endeavor to show what is understood by the nature, essence or proximate cause of diseases; and afterwards, to what extent, the means, which we have at our disposal, are available in aiding us in these investigations.

It is incorrect to suppose that disease consists, essentially and entirely, of the symptoms it exhibits, and the anatomical lesions revealed after death. In those cases of neuralgia in which no appreciable lesion is discernible, there is necessarily some modification in the affected nerve, from which the pain arises. In the development of a phlegmasia or an organic degeneration, as tubercle or cancer, some change is previously effected in the diseased parts, and this change has induced the secondary alterations which, in one case, characterize the inflammation, and, in the other, the cancerous or tuberculous affection. The latter lesions are appreciable to the senses, and are distinguished by their apparent characteristics; but the primary phenomenon which precedes and produces them escapes us, both because it occurs in the most minute parts of the organization, and because the structure, and, consequently, the intimate action of these parts, not only in man, but in all living beings, to whatever kingdom they belong, is beyond our means of investigation.

We are aware that skilful anatomists, by works that deserve the highest praise, are daily extending this branch of knowledge; that, by the most minute injections and the most delicate dissections they are enabled to trace, in the tissue of organs, the course of the vessels and nerves, further than any who have preceded them. But, without referring to the legitimate doubts which may and indeed must arise respecting the accuracy of these results in

* SYDENHAM, *Opera*, tom. i. p. 77.

microscopical anatomy, the continual subjects of dispute and contradiction among those devoted to these labors, it should be recollected that the difficulty is but farther removed, that it still exists, and that if it be possible to show by injections the ultimate arterial ramifications, with the secretory and excretory vessels of the kidneys, pancreas and liver, we still remain ignorant of the structure and action of these vessels, in the mysterious mechanism of the formation of the urine, bile and pancreatic fluid. If it be impossible, then, to distinguish the intimate texture of those parts in their healthy condition, there is a still stronger reason for recognizing the impossibility of appreciating, in disease, the intimate modifications which occur in these delicate parts, whose regular action is to us unintelligible, and whose organization, which death enables us to examine with all our means of investigation, is no less inexplicable. The history of medicine affords but too many proofs in support of this opinion.

This absolute ignorance in regard to the peculiar modifications of the organism in the production of disease, extends also to each of its successive periods, as is evident if we but attempt to leave the domain of secondary phenomena, for the purpose of investigating primary facts. Thus, we are acquainted with the conditions necessary to the production of intermittent fevers, but are unable to discover the mechanism of their production and the return of their paroxysms; we see, in acute diseases, successive periods of increase, acme and decline; we appreciate the successive changes presented by the symptoms in each of these periods, but the discovery of the power which presides over these various changes escapes all our efforts. Farther, when by the aid of means as energetic as quinine, we are enabled to suspend, on any given day and hour, the course of the disease, we must admit that we are completely ignorant, both of its peculiar nature and the action of the successful remedy. In short, health and disease, life and death, subjects so productive, in their sensible phenomena, of meditation and study, are, in regard to their primary causes or nature, incomprehensible mysteries.

Physicians of every age have nevertheless attempted to discover the intimate nature of diseases: some have followed, in these difficult efforts to proceed from the known to the unknown, a course apparently methodical. They supposed that, by carefully considering the causes which produce the disease, its apparent phenomena, the circumstances which modify its course, and the accompanying organic alterations, they should be able to ascertain the intermediate mode of action between the effects and causes, and discover the peculiar change which precedes and induces the secondary modification. But among those who have undertaken these obscure researches, many have followed a more adventurous course. Instead of deducing their opinions from observations, these did not hesitate to modify facts in order to preserve their hypotheses, and to overthrow therapeutics in rendering it conformable to their theories: their proselytes were thus led into a double error;

on the one hand, the path of observation was forsaken, and on the other, an erroneous and dangerous method of treatment was inculcated. There have been at the same time, however, persons of sound judgment and profound sagacity, who, in indulging in these hazardous speculations, have, themselves, placed a proper estimate upon their own conjectures; their only object in proposing them having been to pay the taste of their contemporaries a necessary tribute, without which their works might not have been welcomed. It was thus with Sydenham, who, by a reflection on himself, acknowledged the insufficiency of his own theories, by adding that in regard to practice, he had advanced nothing, the truth of which had not been confirmed by his own experience. "I have directed all my efforts," he farther adds, "to the elucidation of the treatment of diseases, being persuaded that he who can point out a method of cure for the most trivial affection, deserves higher praise than he who becomes distinguished by his powers of reasoning, and those pompous subtleties which are as unprofitable to the physician, in the cure of disease, as the knowledge of music to an architect in the construction of a building."*

The results of researches undertaken for the purpose of acquiring knowledge which is unattainable, have been and must be widely different: we cannot then be surprised at the diversity in the theories which have been proposed in regard to the nature of disease; it would be, on the contrary, a matter of astonishment were this not the case. Among these hypotheses, some are based upon alterations of the humors, others upon those of the solid parts of the body, so that they may be referred to two great divisions, humorism and solidism, each the subject of opinions as numerous as the followers of these two theories.

The *humorists*, who made the essence of disease to consist in the alterations of the fluids, applied, to most affections, *terms* in accordance with their theories. Instead of saying that a disease affected the liver, or the circulatory organs of the blood or lymph, they placed its *seat* in the fluids themselves contained in these organs. The morbid *causes* always affected the fluids; the aliments elaborated by the stomach, and converted into chyle, modified the qualities of the blood; a similar effect was produced by the action of poisons, virus, etc. In their exposition of symptoms, their language was still in conformity with this theory; the color and consistence of the blood, mucus, alvine matters, urine and pus, claimed their particular attention; other symptoms were hardly alluded to, or were attached to their favorite nomenclature by means of collective names. It was from the alterations of the humors that they explained the connection and succession of symptoms. They designated, by the terms, *crudity*, *coction* and *evacuation*, the three principal periods of diseases, according to the condition of the *morbid matter*. In the first period, this matter, endowed with all its deleterious power, not having undergone any alteration, still

* SYDENHAM, *Opera omnia*, tom. i. p. 77.

preserved its crudity ; in the second, in which coction was effected, nature gradually gained the advantage ; and, finally, in the third, the material principle, rendered movable, was evacuated with the urine, sweat, fecal matters, or by some other means, and the equilibrium was restored. When no evacuation took place, they supposed that the morbid matter, after having undergone the necessary elaboration, became assimilated with the natural humors, and from that moment became harmless ; coction was perfect or imperfect ; and the *transformation* of one disease into another was readily explained by means of the transfer or *emigration* of the humoral principle which presided over its development. It was particularly from the inspection of evacuated fluids that they formed conclusions with regard to the termination and duration of diseases ; the urine, particularly, furnished signs to which they attached much importance. They were confirmed in their opinion by *necroscopy* ; the redness and swelling of inflamed parts, they regarded as the effect of an accumulation of blood ; dropsy, as the dissolution of this fluid ; tubercular degeneration they considered but a thickening of lymph ; and most other organic alterations but obstructions produced by the consistence and coagulation of fluids. The *therapeutical* indications were in accordance with the other points of the humoral doctrine. Bleeding was practised in order that the blood might be renewed, to diminish its viscosity, or to remove a portion of the morbid matter with which it was mixed ; purging, sweating, and diuresis were excited for similar purposes ; in short, all the indications consisted in changing the quantity or quality of the fluids, or determining their afflux towards certain organs.

The *solidists* regarded the same subjects in a totally different point of view : according to this class of philosophers, the fluids play but a passive part in the phenomena of life ; deprived of vitality, sensibility and contractility, they are entirely subordinate to the action of the sensible and contractile organs containing them. Disease, consequently, resides *essentially* in the solids, which are alone capable of receiving the impression of morbid *causes*, and of furnishing important *symptoms*. Sympathy, whose seat is the nervous system, satisfactorily explains the connection between the symptoms and the general disturbance which accompanies any local affection. *Metastasis* and *crises* are, in their opinion, more favorable to their own theory, than to that of the humorists. “ Indeed, the discharge of a small quantity of blood, urine, fecal matters or sweat, is insufficient to explain the passage from disease to health, inasmuch as the presence of these in the economy is incapable of deranging the regularity of the functions ; there is, according to them, a transfer of *action** or *irritation*,† and not of fluid ; it is much easier, seriously say they, for nature to transfer one than the other. The organs, in disease, preserve or acquire certain relations, by virtue of which they transmit to each other their impressions ; the

* SPRENGEL, *Pathol. general.*

† MARANDEL, *These sur les Irritations.*

irritation which affects any organ for many days, may thus be transmitted to some other: the first resumes its functions, and if the transmitted affection be slight, health is restored; if it be grave, it constitutes metastasis. The most convincing proof that there is simply a transport of irritation, is, that metastases and crises are sometimes observed, which consist solely in the transfer of pain or some other nervous phenomenon, without the exhalation of any fluid, as is noticed in the neuroses and rheumatic affections. Finally, in cases where there is an afflux of fluid towards an organ, the qualities of this fluid present the greatest variety; the only constant circumstance is an irritation which precedes it, and which is characterized by pruritus, pain, heat, swelling, redness or some other analogous change in the part, where the crisis or metastasis takes place. In regard to the *diagnostic* or *prognostic* signs presented by the fluids, they are always of secondary importance, and the results of necroscopy, which so clearly show the alterations of the solid parts, prove how slender is the basis upon which humoral pathology is founded. Finally, the most accurate *indications* arise from changes in the external appearance, movements and heat, and in the organs of digestion, respiration and circulation; all these symptoms are evidently furnished by the solids, to which these functions belong."

Such are the principal points of the doctrines of humorism and solidism: we have thought proper to present them together, without adding any remark. The old doctrine of humorism was based upon inaccurate data, furnished by the science of chemistry when in its infancy; upon a theory totally false, in which, with an entire disregard of the vital influence, the alterations in the humors were attributed to a fermentation or putrification analogous to what takes place without the body. To show the absurdity of this system, and to overthrow it, was by no means a difficult task. The brilliant physiology of Bichat, the ardor with which Pinel attacked the humoral doctrine, the zeal with which the study of pathological anatomy was prosecuted, together with the prejudice in favor of *solidism*, which naturally arose, all these circumstances rapidly effected a complete revolution in the science, and the entire medical generation of this period and that immediately following, adopted in reality, if not in principle, an exclusive solidism, from which arose and became developed the system of irritation. All influence of the fluids in the development of diseases was rejected, and all the phenomena of life, in disease as well as health, were made to depend immediately upon the solids.

We were among the first, in 1817, to contradict this opinion,* and to endeavor to attach all the importance to the fluids, which they deserve in the phenomena of life, whether in health or disease. We attempted to show, 1st, by the normal composition of the human body, in which the fluids exist in an incomparably larger proportion than the solids; 2dly, by the alterations revealed by

* First edition of this work, 1817.

necroscopy which, in some cases, exclusively affect the fluids; 3dly, by the nature of the various agents by which the health may become deranged, some of which, as the aliments and drinks, introduced into the economy by absorption, evidently modify the composition of the fluids; 4thly, by certain modifications which evidently exist in the lining fluids, as those presented by the blood in scurvy and icterus, by the urine in diabetes, by the bile in the formation of hepatic concretions, etc., that the doctrine of solidism is insufficient to account for the phenomena observed, and, sooner or later, must yield to a less exclusive system.

Since that time, a great change has taken place in the opinions of the medical world. To the facts to which we have just referred, others have been added; the diminution of albumen in the blood and its presence in the urine, in those affected with Bright's disease; the changes in the relative proportion of fibrine and red globules in the blood in inflammatory fevers and chlorotic affections; the presence in this fluid, either of pus in certain diseases, or of venomous substances in cases of poisoning, and the various modifications in the milk, urine and saliva,* have added such a multitude of facts to those which we pointed out twenty years ago, that an entire change of opinion has been effected. The chemical and microscopical labors of many distinguished scientific men, among whom may be mentioned MM. Thenard, Bright, Orfila, Dumas, Andral, Donné, and Rayer, have contributed to restore to the fluids their importance in the phenomena of health and disease. It is possible that after so long discrediting the most manifest alterations in the fluids, we may be at present rather inclined to suspect their existence in all cases, and to admit them upon the slightest indications, and without sufficient observation, and to exaggerate their importance with the threefold reference to etiology, symptomatology and therapeutics: such is the proneness of the human mind to extremes, and the difficulty, in all cases, to maintain a just medium, the surest defence from exaggeration and error.

We shall not follow the humorists and solidists in the numerous alterations which they have supposed, in order to explain the nature of diseases; we shall also abstain from exposing the various systems,† which, from the earliest ages, have successively reigned in the schools. They are now abandoned, and will live only in

* See pages, 185, 186, 208, 211, 225.

† We will, however, except the system of irritation, since its followers have, till quite recently, been numerous, and even now it finds favor with a few.

"According to this theory, health and disease are but different effects of the same principle, that of irritation.

"A disordered state of health is always owing either to an accumulation of excitation or irritation in some part, through the influence of external stimuli whose object is to maintain the functions, or to a deficiency of this principle in the economy.

"The functions may be deranged in two ways; they may be performed with too great or too little energy.

"Irritation is then the primary cause or source of all morbid action; the phlegmasiæ, hæmorrhages, neuroses, and degenerations of every kind, are but its

the history of the science ; they attest the feebleness of the human mind whenever it attempts to attain a knowledge of the primary laws of the organization. In this, as in many other things, we must remain ignorant of what it was not intended we should know. All discussion upon insoluble questions is unprofitable and dangerous ; unprofitable, because it can be followed by no satisfactory results ; dangerous, because it almost always leads to error. When once we enter upon the domain of hypotheses and theories, it often becomes impossible for us to pause, and if, afterwards, we attempt to retrace our steps and return to the investigation of positive subjects, they appear so cold and uninviting, in comparison with the seducing speculations to which we have previously devoted ourselves, that they cannot fail to prove totally devoid of interest.

Although it be shown that the intimate nature of things is above our comprehension, and although this truth has been proclaimed more widely in our own, than any previous age, there are nevertheless persons of true merit, who still think that they may yet be able to explain the secrets of nature, and who have their proselytes. This ceases to be a matter of surprise, if we but glance at the history of medicine ; the human mind is always the same, and may be judged, in the future, by the past. Systems have been the product of all ages, and are still in process of formation : they have had, and will continue to have, their admirers, and will be forgotten, as have been those which preceded them. But, if it be objected that, in order to the proper treatment of a disease, its intimate nature

effects, and cannot be considered as diseases, unless we consider suppuration also an idiopathic affection."

Let us briefly examine this theory, which closely resembles those of Themison and Brown, and see to what extent it has foundation.

It is generally supposed, and is, we believe, incontestable, that all diseases are owing to some change in the action of our organs ; this intimate change precedes and produces all the alterations of tissue ; so that, properly speaking, all that we call *disease* is consecutive to this change. But as this peculiar modification escapes, as we have stated in the preceding chapter, all our means of investigation, reason prompts us, this first truth being known, to direct our study and observation to the appreciable phenomena. It is thus that the progress of medicine has been real ; it has been retrograde whenever it has been attempted to seek the primary causes ; the principal defect in the theory of irritation.

Another and not less remarkable error is, to limit to two modes this change of action, which is the source of all our diseases. According to *M. Broussais*, the stimulants have been either too powerful or too feeble, and the action of the organs is increased or diminished : now, if we may be permitted to reason upon a subject, the knowledge of which it was never intended we should attain, we might ask if it is not probable that besides this increase and diminution of energy, there may also be a perversion of action, itself susceptible of appearing under infinitely various forms. If the effects of this primary change of action occur with numberless modifications, as is evident from the numerous organic alterations which take place in diseases, is it not natural to suppose that the causes which escape us vary with their sensible effects ?

These considerations appear to us more than sufficient to demonstrate the uncertainty and instability of the foundation of the doctrine of irritation. If this were the place to consider this system, the falsity of the consequences would furnish additional proofs of the falsity of the principle.

should be understood, to those we may reply, with *Sydenham*,* that all the acts of nature are alike obscure, and that the Wisdom which ordained the universe, has reserved to himself the knowledge of the laws by which its harmony is maintained; "but, besides," as this celebrated practitioner remarks, "it is not upon a knowledge of the first causes that therapeutics is based, but rather upon observation and experience, which can and should alone guide the physician in the practice of his profession."

We might have dispensed with the chapter upon the nature of disease, which but reveals our own ignorance in regard to it, and teaches us to abstain from directing our powerless efforts towards its discovery; but it is no less important, in the study of the science, to point out the paths which lead to error, than those which conduct to a knowledge of truth. — O.

CHAPTER XXI.

CLASSIFICATION OF DISEASES.

THE classification of diseases, or *nosology*,† is that branch of medicine whose object is the methodical distribution of diseases into a certain number of groups, to which the term *classes* has been applied, and which are commonly subdivided into orders or families, to these being referred all the genera and known species.

Felix Plater appears to have been the first to conceive and carry into execution, the idea of a methodical distribution of diseases.

The division proposed by *Plater* was hardly known, when *Sauvages* published, in the eighteenth century, his *Nosologie Methodique*, which was very favorably received, and considered as the first work of its kind. Diseases were by him divided into ten classes, which he designated by the terms, *deformities*, *fevers*, *phlegmasiæ*, *spasms*, *anhelations*, *debilities*, *pains*, *vesaniæ*, *fluxes* and *cachexies*. Each of these classes was divided into several orders, to which were referred a certain number of genera, which presented all the characters of the class and order to which they belonged, and also characteristics peculiar to themselves.

The classification of *Linnaeus* closely resembled that of *Sauvages*; he added another class of diseases, which he designated by the title *suppressions*, transferring some of those affections, considered by *Sauvages* under the class of fevers, into the class of critical diseases, or those characterized by a brick colored sediment in the urine.

* *Opera Omnia*, tom. i. p. 66.

† *Nóσος*, disease; *λεγω*, I collect.

Vogel, *Sagar* and *Vitel* admitted nearly the same classes, under different names.

Cullen reduced the classes of diseases to four, viz. : three classes of *general* affections, *pyrexiae*, *neuroses* and *cachexies*, and one class of *local* affections.

Macbride also admitted four classes, which he designated by the terms *general*, *local*, *sexual* and *puerile* diseases.

All these classifications present so many defects and incongruities, that they have been generally abandoned. Those of *Darwin*, *Tourdes* and *Baumes* are based upon theories too unstable to be received.

The classification of *Pinel* is far less objectionable than any preceding it. This physician divided diseases into five classes, viz. : *fevers*, *phlegmasiæ*, *hæmorrhages*, *neuroses* and *organic affections*. This classification approaches nearer than the others to that perfection of which the subject is capable. If, in his distribution of diseases, *Pinel* has sometimes approximated affections which it would seem should be separately considered, and separated others which should more naturally have been connected, these imperfections do not prevent his nosological system from holding the first rank. Besides, it is very doubtful if a nosological classification can ever be as methodical, notwithstanding the idea of *Gaebius*,* as those of plants and animals, the characters of the latter being more defined and more easily distinguishable.

These different classifications only comprise those within the domain of medical pathology. Surgical diseases have also their classifications, which are generally established according to the seat rather than the peculiar forms of these diseases: some authors have also objected that the divisions of external diseases, however methodical they may be, should not be considered as classifications properly so called. It matters little, however, whether diseases be *methodically distributed* or *classed*, provided they be so presented as to render their exposition the most easy.

Classifications are not indispensable to the study of pathology. They have been for some time dispensed with, and it is not certain that they have had any influence upon the progress of the science. A good classification, however, aids and abridges the study, and hence its utility cannot be questioned. Besides, by presenting under a distinct head all the known diseases, it leads to a more precise knowledge of their analogies and differences, and to a more just appreciation of the value of general assertions and points of doctrine, by enabling us to make a rapid application of them, to all the groups of diseases, arranged according to some order which should be always present in the physician's mind.

* *Non est cur disperent medici, fore aliquando, ut ingens morborum humanorum numerus, exemplo ab historicæ naturalis scriptoribus petito, in ordinem systematicum redigatur, qui ab omni hypothesi, sectarumque commentis liber, solâ nixus fideli observatione, classes, genera, species exhibeat, suis singula characteris, certis manifestis, plenè interstructa. — (Institut. Pathol.)*

Apart from these advantages, nosology presents serious inconveniences: the necessity of dividing all diseases, into a limited number of classes, has led nosologists to bring together, in the same series, diseases of a widely different nature, and often to omit those which would not so naturally belong to the adopted group.

The different parts which collectively constitute the human body are subject to numerous diseases, some of which are common to all these parts, as inflammation, affections properly so called, atrophy and hypertrophy, alterations of secretion and innervation, and, also, the lesions produced by physical and chemical agents; others are peculiar to each of the organs, affecting their structure alone, and having no analogy, or at least a very remote one, to the diseases of other parts. Among the latter affections, may be mentioned the various cutaneous exanthemata, apthæ and the diphtheritic affections, rheumatism, emphysema, rachitis, invagination, varix, aneurism, calculous affections, and certain primary alterations of the fluids, as anemia and diabetes, all affections differing from others in that they affect the structure or composition of the solid parts or fluids. These affections cannot be properly included in our classifications, the latter being particularly applicable to those diseases which may affect all parts of the body.

We were led, from these considerations, upon devoting ourselves more particularly to the instruction of pathology, to adopt a classification only of those diseases capable of such an arrangement, as the phlegmasiæ, morbid secretions, the neuroses and common organic lesions, without attempting the classification of those peculiar to the various parts which collectively constitute the human body. We are thus enabled to reap all the advantages and avoid all the inconveniences necessarily connected with the classification of diseases. — O.

CHAPTER XXII.

PRINCIPAL TREATISES ON GENERAL PATHOLOGY.

THE first notions upon General Pathology are nearly as ancient as medicine itself: they are found in the writings of *Hippocrates*. His Treatise upon the Atmosphere, Water, and Localities, is particularly devoted to *etiology*, and *prognosis* is exhibited in many of his books with admirable precision. *Hippocrates*, however, has not considered diseases in an abstract manner. *Galen* seems to be the first who conceived this idea.

In his essay *de Differentiis Morborum*, this accomplished physician first gives a general definition of disease, and this definition is nearly the one we have adopted; he afterwards treats of its distinctions, and divides into three groups the various affections,

according as they are peculiar to homogeneous and organic parts, or common to both; he subdivides them all into simple and complex diseases.

In other works* he treats generally of the causes and seat of diseases, of symptoms and their differences, of periods, which he ingeniously compares to the different ages of life; of types, crises, and decretory days. We find also in his works some general remarks upon semeiology and therapeutics. Thus *Galen*, without having written a special treatise upon this subject, has displayed the principal doctrinal points belonging to it, in as many separate books: on this account we do not hesitate to consider him the founder of general pathology.

The perusal of the works written upon this branch of medicine is peculiarly fitted to confirm this opinion. Not to mention those who, up to the epoch of the revival of literature, had confined themselves to the translation or repetition of what had been said before their time, we see the most noted physicians of the later centuries, as *Fernel*, *Sennert*, *Rivière*, and *Plempius*, doing nothing more than to complete, in a somewhat different manner, the plan traced by *Galen*. *Boerhaave* himself has followed a similar course, except in the distribution of symptoms.

The Treatise on Pathology by *Fernel* is included in his Universal Medicine; † it is divided into two parts: the first treats of disease in general, and of its causes; the second of symptoms and signs. In the portion devoted to disease and health, he remarks that each has a certain *latitude*, and that between these opposite conditions there exists an *intermediate stage*, (*constitutio neutra*,) which participates in the characteristics of each, but which differs from both; this condition may more nearly resemble health or disease, or maintain a medium position between them. *Fernel*, in his Semeiology, treats particularly of critical signs, dividing them into general and particular, and subdividing them very methodically into the antecedent, accompanying and following signs of crisis.

In the work of *Sennert* ‡ we also find numerous fundamental ideas. When speaking of the symptoms furnished by various functions, he examines successively their abolition, diminution, depravation and exaltation; it would be difficult to form a more convenient division. He establishes, moreover, a distinction between diseases, according as they supervene under ordinary circumstances, or unusual conditions: to these two divisions he gives the names *morbi congrui et incongrui*.

Lazare Rivière, in his Institutes of Medicine, § treats of disease

* *De causis liber unus.* — *Liber de Locis affectis.* — *De symptomatum differentiis liber unus.* — *De symptomatum causis libri tres.* — *De morborum temporibus liber unus.* — *Liber de totius Morbi temporibus.* — *Liber de Typis.* — *Liber de Crisibus.* — *Liber de Diebus decretoriis.*

† JOANNIS FERNELII, *Universa Medicina*. Venitiis. 1564, in-4°.

‡ *Institutionum Medicinæ*, libri v. Auctore Daniele Sennerto. Wittebergæ.

§ LAZARI RIVERII, *Opera medica universa*, in quibus continentur *Institutionum Medicarum*, libri v. Lugduni, 1676.

in general; a chapter is devoted to the *changes* in disease, and semeiology is divided into two branches, one relating to diagnosis, the other to prognosis. The treatises of *Plempius** and *Charlton*† contain nothing remarkable.

Boerhaave, in his *Institutes of Medicine*,‡ has devoted a few pages only, to general pathology; the concise remarks which he has made upon this subject have been the theme of very extensive commentaries. Among the authors who have thus labored, we find the names of *Haller*§ and of *Dehaen*;|| the lectures of the latter, collected by *Wasserberg*, contain all that is most interesting; but a more or less detailed description of all diseases is also found in them, and such a description, although it may with propriety be treated of in the institutes of medicine, is out of place in a work upon general pathology.

Among the published works upon this subject, the *Institutes of Pathology* by *Gaubius*¶ is certainly one of the most remarkable; we discover, in many portions, ingenious thoughts, profound reflections, and luminous comparisons, which justify the favorable reception accorded to the work, and its well deserved reputation at the present day. He was the first to give the name *General Pathology* to the branch of medicine of which we treat.

The *Pathological Tables* of *Juncker*** form a valuable collection, in which we find enumerated the various opinions of most authors upon the principal doctrinal points. The form of this work renders its perusal fatiguing, but it may be consulted with advantage.

The short treatises of *Ludwig*†† and *Astruc*‡‡ constitute abridgments of pathological doctrines; the latter is written with a degree of elegance which has doubtless contributed to the success it has obtained.

Since the commencement of this century, many works upon general pathology have been published in Germany; a few have also appeared in France. Many of these contain a

* *Vopisci Fortunati PLEMPII, de Fundamentis Medicinæ, libri vi. Lovanii, 1638.*

† *Exercitationes Pathologicæ in quibus morborum penè omnium natura, generatio, et causæ ex novis anatomicorum inventis sedulò inquiruntur, à Gualtero Charltono. Londini, 1661.*

‡ *Institutiones Medicæ in usus annuæ exercitationis domesticos digestæ, ab Hermanno Boerhaave. Editio ultima. Parisiis, 1747.*

§ *Hermanni BOERHAAVII, Praelectiones academicæ in proprias Institutiones rei Medicæ, edidit Albertus Haller. Gottingæ, 1744.*

|| *Praelectiones Antonii DEHAEN in Hermanni Boerhaavi, Institutiones Pathologicæ collegit, recensuit, additamentis auxit, edidit, F. de Wasserberg. Editio nova. Colonia-Allobrogum, 1784; 2 vol. in 4°.*

¶ *Institutiones Pathologiæ medicinalis. Auctore H. D. GAUBIO. Leidæ Batavorum, 1758.*

** *Conspectus Pathologiæ ad dogmata stahlianæ præcipuè adornatæ, et semeiologiæ Hippocratico-Galenicæ in forma tabularum representatus. Auctore D. J. JUNCCKERO. Hale-Magdeburgicæ, 1736.*

†† *D. Christ. Gottlieb LUDWIG, Institutiones Pathologiæ. Lipsiæ, 1767.*

‡‡ *Joannis ASTRUC, Tractatus Pathologicus, editio quarta. Parisiis, 1767.*

more or less complete account of generally admitted opinions; some of them present different ideas from those commonly entertained: we shall confine ourselves to a concise enumeration of the latter.

The General Pathology of *Sprengel*,* first published in German, and afterwards in Latin, is, without any doubt, one of the most finished works upon this subject; we have elsewhere remarked upon the plan adopted by this author, and have said that he occasionally added peculiar descriptions of diseases foreign to his subject, and omitted certain doctrinal points which seem naturally to belong to it;† but these slight defects in the arrangement of the work are redeemed by the manner in which most of the subjects are treated. Nearly the same may be said of the Treatise of M. *Caillot*,‡ published two years after the first edition of the present work, and also of that which appeared much more recently, with the same title, by M. Dubois, of Amiens, one of the distinguished physicians of our times. His opinions upon the nature of disease, and the limits and extent of general pathology, differ very much from our own: it is not, however, our province to pronounce judgment upon them.

Reil, who has been called the Pinel of Germany, has published a work upon this subject, in which he refers all the phenomena which are manifested in the human body, in health or disease, to chemical conditions. If the composition of the animal matter be intact, health is the consequence; disease reveals a certain change in this composition.

Dr. Puchelt, Professor of the Faculty of Heidelberg, in his Treatise upon Hygiene, Pathology and general Therapeutics, has presented some ingenious considerations upon the action of morbid causes, which he divides into *mechanical* or *physical*, which act upon the *organs*; chemical, which act upon the *humors*; and *dynamic*, which act upon the functions. He thinks that the course of diseases is subject to *planetary* influences, and particularly to the lunar phases.

Professor Schonlein, one of the most celebrated practitioners of Germany, recently elected to fill the chair of general and special pathology at Berlin, has delivered lectures upon this subject, which have been collected and published by his pupils. He looks upon disease as a contest between the principles of *egoism* and the *planetary* principle, or, to speak in terms more in conformity with our language, a contest between vital laws and those which rule the universe. The particular form of diseases is subordinate to the nature of their productive causes, to the organ which receives their impression, and to the individuality of the patient.

* CURTII SPRENGEL, *Institutiones Medicæ*, t. iii., *Pathologia generalis*. Amstelodami, 1813.

† Page 4.

‡ *Elémens de Pathologie générale et de Physiologie pathologique*, par L. Caillot, ancien médecin en chef de la Marine. Paris, 1819.

Dr. C. H. Rosch endeavors, in an ingenious work, to give to humoral pathology the importance it possessed among the ancients, and to establish upon a basis of facts the existence of primary affections of the blood and the other humors. Dr. Hauff, in a volume, entitled *Solidarpathologie und Humoralpathologie*, attempts to disprove the theory of his compatriot, and to show that the nervous system is the *spiritus rector vite*, the governing and conservative principle of all the functions. According to this system, chlorosis itself is but the consequence of some disturbance of the nervous system.*

A defect common to the greater number of the works we have just enumerated, is the almost universal presentation of theories associated with whatever facts appertain to general pathology, which render its study dangerous when they are favorable, and tedious when they are abandoned. Every work published previously to the close of the last century is infected with the humoral theory, manifested in various forms. In recent treatises, the nervous fluid, irritation and the vital properties, are unceasingly mingled with, or substituted for, the appreciable phenomena of diseases.

There remains a certain number of works which, without comprising the whole of general pathology, belong, notwithstanding, to the bibliographical history of that science, because they are devoted to the elucidation of one or more points connected with it.

In advance of all others, we rank the Treatise on Experience, by *Zimmermann*,† which is worthy alike of a skilful physician and a distinguished philosopher. The work of *Testa*,‡ upon *Periods* in health and disease, although it does not exhibit so high an order of thought, is no less important in a professional point of view. The Pathogeny of *Hufeland*§ also deserves particular attention; but hypotheses are so often mingled with facts, that the perusal of this ingenious essay is not without danger to those just commencing their professional studies. It is quite otherwise in respect to the considerations upon general pathology, with which the same author commences his Manual of Practical Medicine, which are the production of a mind matured by experience. A large number of theses read before the Faculty of Medicine at Paris, particularly those of *Bayle*, *Bally*, *Marandel*, etc., contain an exposition of many interesting points in general pathology. The Analytical Table of *Chaussier* upon health and disease, the excellent Semeiology of *M. Landré-Beauvais*, and the considerations upon general pathol-

* We are indebted to Dr. Otterburg, of Heidelberg, for information in regard to several German works, that we could not ourselves have consulted, they not having been translated.

† *Traité de l'Expérience en général, et dans l'art de guérir en particulier*, traduit par Lefebvre de Villebrune. Avignon, 1800.

‡ *Testa*, *De vitalibus Periodis ægrotantium et sanorum*. Londini.

§ *Idées sur la Pathogénie, ou Considérations sur l'influence de la force vitale sur l'origine et la forme des Maladies*, par Christ. Will. HUFELAND, 1795.— (A long extract is contained in the *Bibliothèque Germanique*.)

ogy which constitute the introduction to the Clinical Medicine of Professor *Rostan*, are, moreover, works whose perusal and study we cannot too strongly recommend; the Semeiology of M. *Double* may also be read with advantage.

The above are, to the best of our knowledge, the principal treatises which have been published, both upon the entire science and upon detached portions of pathology. Many of these we have studied, others have been consulted, and certain selections made from them for the present work. The course of instruction in general pathology by Professor *Andral*, will doubtless communicate a new and powerful impulse to this important and too little cultivated portion of medical science. Our design, we do not hesitate to repeat, has been to define distinctly the limits of our subject, endeavoring to attain without overstepping them, and to offer, in an essentially abstract manner, a doctrine free from theories, and founded solely upon facts and their immediate and rigorous consequences. — M.

[The only works that have been published upon *General Pathology* within our knowledge, since the issue of the last edition of the present work, are the "Outlines of Pathology, and Practice of Medicine," by William Pulteney Alison, M. D., of Edinburgh; and the Principles of Medicine, comprising General Pathology and Therapeutics, and a brief general view of Etiology, Nosology, Semeiology, Diagnosis and Prognosis," by C. J. B. Williams, M. D., of London. — TRANS.]

INDEX.

A.

Abdomen (symptomatology), 92; (diagnosis), 308.
 Abscess, by congestion, 202; metastatic, 202.
 Absorption (symptomatology), 220.
 Access, 231.
 Acquired diseases, 64.
 Acute and chronic diseases, 233.
 Ægophony, 149.
 Affections, moral, 36.
 Affective functions, symptoms furnished by the, 110.
 Age, its influence upon the seat of diseases, 18; upon their production, 39; upon their prognosis, 344.
 Agents, chemical (etiology), 20.
 Agrypnia, 114.
 Air, atmospheric, 32; cold air, warm air, 32; moist air, 32; unrenewed air, 32; its variations of temperature, 32; of pressure, 33.
 Alopecia, 90.
 Alterations of organs, discovered after death, 357; of the fluids, 374; of the gases, 377. Some anterior to the symptoms, others occur during the disease, in the agony, or after death. They may occur without there being any symptom to indicate their existence, 379.
 Alvine excretion, 131; matters, 131; their nature, 131; consistence, 132; color, 132; form, 132; odor, 133; foreign bodies, 133.
 Anaphrodisia, 226.
 Anasarca, 77.
 Animals, parasitic, 24.
 Annual diseases, 64.
 Anorexia, 117.
 Apnœa, 136.
 Aphonia, 102; a prognostic sign, 349.
 Appetite, 117; venereal, 226.
 Applicata (etiology), 23, 45.
 Aptitudes, 37, 57.
 Apyrexia, 231.
 Arteries, symptoms furnished by, 170; auscultation of, 179.
 Atmosphere, its influence in the production of disease, 32.

Attack, 231.
 Attitude, in health, 75; in disease, 75; a cause of disease, 51; a prognostic sign, 348.
 Auscultation, 290; mediate and immediate, 290; rules to be observed in, 292; of respiration, 138; of the voice, 148; of the cough, 154; of the heart, 166; of the arteries, 179; its other applications, 290; in cerebral disease, 290.
 Authors upon General Pathology, 444.

B.

Balbuties, 103.
 Barrenness, 226.
 Baths (etiology), 48.
 Beds (etiology), 48; as a hygienic means, 431.
 Bellows murmur of heart, 167; of arteries, 179.
 Bile, secretion, excretion and alterations of, 208, 209.
 Blood, experiments upon the, 182; alterations of, in respect to color, 184; odor, 185; taste, 185; temperature, 185; separation of its elements, and their modifications in different diseases, 185; foreign substances, 186; deleterious principles, 188; gases, 189.
 Bodies, foreign, living and inanimate, 378; vulnerant (etiology), 23; their action, 55.
 Body, increase in the volume of the, 76; its causes, 76; diminution in the volume of, 77.
 Bones (symptomatology), 97.
 Borborygmi, 128.
 Boulimia, 117.
 Bronchophony, 148.
 Bubo, 191.
 Buffy coat of the blood, 187.

C.

Calculi, 216.
 Cancer, forms of, 370.
 Capillary circulation, symptoms furnished by, 180.
 Caries, 97.
 Carphologia, 99.

- Caruncula lachrymalis (symptomatology), 87.
 Carus, 115.
 Catalepsy, 101.
 Cataphora, 115.
 Causes, definition of, 19; exist around and within us, 19; ancient division of, 20; three classes of, 21; their mode of action, 55; their obscurity in some cases, 63; their utility in diagnosis, 311; determining, 21; common determining, 21; specific determining, 25; ordinary specific, 25; contagious specific, 26; their mode of action, 27; predisposing, 31; general predisposing, 32; individual predisposing, 36, 44; aptitudes, 37, 57; their mode of action, 58; occasional, or exciting, 53; they differ from specific and determining, 54; their mode of action, 55.
 Cephalalgia, 107; often a sympathetic phenomenon, 324.
 Chattering of the teeth, 118.
 Cheeks (symptomatology), 88.
 Chemical means, employment of, in diagnosis, 297.
 Chemistry, its application to therapeutics, 405.
 Chest, 91; its inspection, 91; percussion, 151; auscultation, 292; mensuration, 284.
 Chin (symptomatology), 89.
 Chorea, 102.
 Chronic diseases, 233.
 Circulation (symptomatology), 162; of blood, 163; in the heart, 163; arteries, 170; capillary vessels, 180; veins, 181; of lymph, 189.
 Circumfusa (etiology), 22.
 Classification of diseases, 442.
 Climate, influence of, upon the progress of diseases, 239; upon their prognosis, 346.
 Climacteric years, 40.
 Clonic spasms, 100.
 Clothing, effect of, as a cause of disease, 45; wet, effects of, 36.
 Coction, 437.
 Color of the skin, 78.
 Coma, its two varieties, 115; its diagnostic value, 324.
 Complications, 270; their distinction, 271; causes, 272; reciprocal influence of complicated diseases, 272; are obstacles to diagnosis, 337; their prognostic value, 347.
 Compression (etiology), 45.
 Congenital diseases, 64.
 Conjunctiva (symptomatology), 87.
 Consecutive phenomena, 262.
 Constipation (symptomatology), 129; a prognostic sign, 353.
 Constitution (etiology), 42.
 Constitutions medical, 65.
 Contagious principles, 26; their properties, 27; origin, 29; theory of Linnæus, 31; their action, 56.
 Contagion, 27; modes of, 28; circumstances which favor it, 28; to ascertain if a disease be contagious, 66.
 Continued type, 231.
 Contractility, muscular, 98; lesions of, 98.
 Contractura, 102.
 Convalescence, 259; its phenomena, 259; its duration, 261; circumstances which modify it, 261; a predisposing cause of disease, 43; therapeutics of, 423.
 Convulsions, 99; clonic, 100; tonic, 100; their diagnostic value, 324; prognostic value, 349.
 Cornea, examination of the, 85.
 Corns, 46.
 Corsets, use of, 46.
 Cough, 152; its varieties, 153; auscultation of, 154; sympathetic, 329.
 Counter indications, 421.
 Course of diseases, 230.
 Crachotment, 155.
 Cramp, 99.
 Crepitation, 97.
 Crisis, doctrine of, 246; division, 245; theory of, according to the humorists, 438; solidists, 438.
 Critical days, 256; phenomena, 247; signs which precede and accompany, 248; favorable circumstances, 252; their influence upon the changes that take place, 253.
 Crocidismus, 99.
 Crudity, 437.
 Crusts, 206.
 Crystalline (symptomatology), 86.
 Cure (termination of diseases), 242; in general diseases, 243; in local diseases, 243; in chronic diseases, 244.

D.

- Days, critical, doctrine of, 256; indicating, 256; intercalary, non-decretory, 257; doctrine of Hippocrates, of Galen, 257; medical, mode of reckoning, 240.
 Death, termination by, 244.
 Decline of diseases, 235.
 Decretory days, 256.
 Decubitus (symptomatology), 75; a prognostic sign, 348; dorsal, 75; lateral, 76.
 Defecation, 130.
 Definition of disease according to its intimate nature, 7; that of Sydenham, 7; of M. Littré, 9; of the author, 11; of diseases in particular, 11.
 Degeneration (pathol. anat.), 373. See organic transformations.

- Deglutition (symptomatology), 123; accelerated, 123; difficult, 124; impossible, depraved, 124; prognostic value of disordered, 353.
 Degrees of diseases, 235.
 Delirium, 111; its causes and forms, 112; often a sympathetic phenomenon, 323; its prognostic value, 351.
 Deposits, urinary, 217.
 Descent, a predisposing cause, 37.
 Determining causes, 21; common, 21; specific, 25.
 Deuteropathic diseases, 69.
 Diadexis, 245.
 Diagnosis, 273; signs on which it is based, 273; conditions necessary to its establishment on the part of the physician and patient, 275; its principal elements, 311; circumstances which render it difficult or uncertain, 321; 1st, the period at which the patient is examined, 321; 2d, predominance of sympathetic phenomena, 323; 3d, rareness of the disease, 336; complications, 337; dishonesty of patients, 338; diagnosis the foundation of prognosis, 343.
 Diarrhœa, 129.
 Diathesis, 59; principal kinds, 59.
 Digestion (symptomatology), 117; stom-achal, 125.
 Disease, definitions of, 6; diseases common to all, or peculiar to certain tissues, 17.
 Diseases, circumscribed, disseminated, 17; innate, congenital, 64; acquired, sporadic, 64; pandemic, annual, stationary, intercurrent, endemic, 64; epidemic, 65; essential, primitive, protopathic, 69; symptomatic, secondary, deuteropathic, 69; concealed, feigned, 338; acute, chronic, 233.
 Disgust, 118.
 Distinction of diseases according to their causes, 64.
 Diurnal revolution, its influence on the course of diseases, 236.
 Drinks (etiology), 49.
 Dumbness, 104.
 Duration of diseases, 240; sometimes uncertain, 240; sometimes fixed, 241; circumstances which influence, 241; its influence on prognosis, 347.
 Dysorexia, 117.
 Dyspermasia, 224.
 Dysphagia, 124.
 Dyspnœa, 135; sympathetic, 329.
 Dysuria, 211.
 E.
 Ears (symptomatology), 90.
 Electricity (etiology), 33.
 Emaciation (symptomatology), 77, 223; its prognostic value, 348.
 Emanations, metallic, animal and vegetable, causes of disease, 25.
 Emphysema, 77.
 Emprosthotonos, 100.
 Encephaloid disease, 370.
 Endemic diseases, 64.
 Eneorema, 217.
 Epheermal diseases, 241.
 Ephialtes, 114.
 Epidemic diseases, 65.
 Epigenemata, 229.
 Epiphenomena, 229.
 Erections, 224.
 Eruptions, 80.
 Essential diseases, 69.
 Etiology, 19.
 Etymology, 15.
 Evacuations, excessive or suppressed, 50, 51; involuntary, in prognosis, 354.
 Exacerbation, 231.
 Exciting causes, 53.
 Excreation, 155.
 Excrements, 131.
 Excreta, 50.
 Excretions (symptomatology), 219.
 Excoriations (symptomatology), 81.
 Exercise, its influence as a cause of disease, 51.
 Exhalations, 196; natural, 196; morbid, 200; artificial, 206.
 Exophthalmia, 85.
 Expectoration, 154.
 Experience, one of the bases of therapeutics, 403; should not be confounded with experiment, 403; the latter belongs to science, the former to the physician, 403.
 Experiment, 383.
 Experimentation, in therapeutics, 383; its object, 383; rules to be observed in regard to, 383; its advantages and inconveniences, 391; cases in which it becomes a duty, 392; in which it should never be attempted, 392.
 Expulsion, 154.
 Extent (to determine the extent of a disease,) 315.
 Exterior of the body, symptoms to be derived from, 75; its value in diagnosis, 298; in prognosis, 348.
 Eyebrows, 87.
 Eyelashes, 87.
 Eyelids, 86.
 Eyes, 84; an important phenomenon, pointed out by Sanson, in the diagnosis of many diseases of the, 86.
 F.
 Face (symptomatology), 81; pinched, 82; hippocratic, 82; opinions of M. Jadelot, 83; motions of, 83; volume, 83; color, 84; its eruptions, 84.
 Facies vultuosa, 82.
 Fainting, 116.

Family diseases, 39.
 Fatty transformation, 372.
 Features, alterations of the, 82.
 Febrile state or movement, its diagnostic value, 332; its acute and chronic form, 332; its continued, remittent, intermittent type, 335.
 Feet (symptomatology), 96.
 Fissures, 81.
 Fistulæ (symptomatology), 81.
 Flesh, firmness and flaccidity of, 78.
 Fluctuation, 81.
 Flux cæliac, 131.
 Food, quality of, 36; diminution or excess in quantity of, 48.
 Forces, vital, 356; their estimation, 408; oppression, 411; therapeutical indication furnished by them, 408.
 Fortune (etiology), 43.
 Forehead (symptomatology), 88.
 Friction sound of pleura, 147; pericardium, 168; peritoneum, 290
 Functions, affective, 110; assimilative, 116; generative, 223; intellectual, 111; of relation, 75.

G.

Gangrene, 368.
 Gases, irrespirable and deleterious, causes of disease, 22; in the blood, 189; exhalation of, 200.
 Genera in pathology, 266.
 Generation, phenomena presented in disease by the organs of, 94.
 Generative functions, symptoms furnished by the, 223.
 Gestæ, (etiology), 51.
 Glands, lymphatic, 190.
 Goitre, 33.
 Granulations, 369.
 Gravel, 216.
 Grinding of the teeth, 118.
 Gums, 119.
 Gurgling in the stomach, 128; in the intestines, 128; in the chest, 141; circumscribed, 142; extending over the whole of one side of the chest, and everywhere uniform as to rhythm and intensity, 142.

H.

Habit (etiology), 42; preservative disposition of, 62; often furnishes therapeutical indications, 417.
 Hæmorrhages, 200; their divisions, 201; diagnostic value, 326; prognostic value, 356.
 Hallucinations, 108; differ from illusions, 108.
 Hair, 90.
 Head, symptoms furnished by, 81.
 Health, definition of, 7; a predisposing cause, 43.

Hearing, alterations in the sense of, 109.
 Heart (symptomatology), 163; extent of its pulsations, 164; its impulse, 165; nature of the sounds, 166; rhythm, 169; sympathetic disturbances, 325.
 Heat, morbid, 192; means of its appreciation, 192; increase of, 193; diminution of, 194; its perversion, 195; its prognostic value, 355; atmospheric, 22.
 Heavenly bodies, their influence on the course of diseases, 238.
 Hectic fever, diagnostic value of, 335.
 Hemiplegia, 98.
 Hereditary diseases, 37.
 Hesitation of the voice, 103.
 Hiccup (symptomatology), 152; a prognostic sign, 354.
 Horripilation, 194.
 Humorists, doctrine of the, 437.
 Hunger (symptomatology), 117; increased, diminished, 117; deprived, 118; its prognostic value, 352.
 Hydrophobia, 124.
 Hydrops, its diagnostic value, 327.
 Hygienic means, 428; in acute diseases, 429; in chronic diseases, 434.
 Hygroma, 46.
 Hypostasis, 217.

I.

Idiopathic, 153, (note).
 Idiosyncrasies, morbid, 60; preservative, 61.
 Ileus, 129.
 Illusions, 108.
 Imminence of diseases, 70.
 Impotency, 224.
 Impulse of the heart, 165.
 Increase in stature during disease, 77.
 Incubation, period of, 70.
 Incubus, 114.
 Indications, 406; their bases, 406; are furnished by the kind of disease, 406; by its character, its type, 407; the state of the vital forces, 408; intensity of the disease, the periods, 412; the symptoms, 413; the seat, complications, and causes, 414; the temperament, constitution, age, sex, profession, regimen, 415; commemorative, 416; the means already employed, 418; epidemic constitutions, 419; tendency of disease, 419; obscure, 421; predilection and antipathy of physicians in regard to certain indications, 422; prophylactic, 422; vary in the course of a disease, 427; the same may be answered in many ways, 427; of convalescence, and those furnished by consecutive phenomena, 423.
 Infiltration, 76.
 Inflammation, anatomical characteristics of, in the principal tissues, 366.

Ingesta (etiology), 23, 48.
 Innate diseases, 64.
 Inquietude, physical, 76.
 Insomnia, 114.
 Institutions, political, 36.
 Instruments, necessary in necroscopy, 359.
 Intellect, alterations of, 111.
 Intellectual functions, symptoms furnished by, 111.
 Intemperance, as a prognostic sign, 345.
 Intercurrent diseases, 64.
 Intermission, period of, 231.
 Intermittent type, 231.
 Interrogation of patients, 298.
 Intestinal canal, symptoms furnished by, 128.
 Invasion, 234; in prognosis, 346.
 Irritation, theory of, 440.
 Ischuria, 211.

J.

Jactitation, 76.

L.

Labia majora, 95.
 Lachrymal sac (symptomatology), 87.
 Laughing, 152.
 Leanness, 223.
 Lesion, to determine the nature of a, 316; its degree, 318.
 Lesions, of structure, 365; conformation, volume and color, 373.
 Lethargy, 115.
 Leucophlegmasia, 77.
 Lientery, 131.
 Light, its influence upon the progress of diseases, 237; absence of, a cause of disease, 33.
 Limbs, symptoms furnished by the, 95.
 Lipopsychia, 115.
 Lipothymia, 115.
 Lips, 88.
 Localities (etiology), 34.
 Lochia, 225.
 Locomotion, symptoms furnished by the organs of, 97.
 Lymph, circulation of, 189; alterations of, 191.

M.

Magnifying glass, 297.
 Malacia, 118.
 Mammæ, 91.
 Marasmus, 77.
 Mastication (symptomatology), 123.
 Means, general or hygienic, 428; in acute diseases, 429; chronic diseases, 434.
 Medicine of tradition, 404; its importance, 404.
 Medicines, a cause of disease, 49; diffi-

culty of appreciating their influence, and making a methodical classification of them, 425; their forms and doses, 428.
 Meibomius, fluid of the follicles of, 207.
 Melanosis, 371.
 Menstruation, 224; its increase, 224; diminution and deviation of, 225.
 Mensuration, 283; mode of practising, and precautions to be observed in, 283; of the limbs, 284; of the chest, 284; its results, 284; in cases of pleuritic effusion, 285; of the abdomen, 285; of the pelvic diameters, 286.
 Mental labor (etiology), 52.
 Metallic tinkling, 145; theories of, 145.
 Metaschematismus, 245.
 Metastasis, metapostosis, 245.
 Meteorism (symptomatology), 93; in prognosis, 353.
 Method, numerical, 392.
 Merycismus, 126.
 Miasmata (etiology), 25.
 Microscope, applications of, to the alterations of the blood, 297; of mucus, of pus, 297; of milk, 297; of urinary deposits, 218; its employment in diagnosis, generally, 297.
 Milk, its secretion, excretion, deviation, 225.
 Mode of examining and questioning patients, 293; of conducting post-mortem examinations, 358.
 Movements (etiology), 23, 51; (symptom.), 98.
 Mucus, its properties and alterations, 198.
 Murmur, bellows, of heart, 167; of the arteries, 179; respiratory, 138.
 Muscles (symptomatology), 98.
 Mussion, 102.
 Myopia, 85.

N.

Nails, 96.
 Nature of disease, 435.
 Nares (symptomatology), 88.
 Nausea (symptomatology), 125; as a prognostic sign, 353.
 Nebula in the urine, 217.
 Neck (symptomatology), 90.
 Necroscopy, mode of procedure in, 353.
 Night, its influence upon the course of diseases, 237.
 Nightmare, 114.
 Nomenclature, pathological, 13.
 Nose (symptomatology), 88.
 Numerical method, 392.
 Nutrition (symptomatology), 222.

O.

Observation, the basis of therapeutics, 383; conditions for a correct mode of, in medicine, 381; the spirit of, 382.

Œdema, 77.

Opisthotonos, 100.

Organs of locomotion (symptom.), 97.

Orthopnœa, 135.

Ossification, 373.

P.

Palpation, 278; mode of performing, 278.

Pain (symptomatology), 105; its causes, 105; its effects, 105; its modifications, 106; intensity, 106; type, 107; varieties, and different names according to its seat, 107; prognostic value, 350.

Pancreatic fluid, 210.

Pandemic diseases, 64.

Paralysis, 98; its diagnostic value, 325.

Paraplegia, 98.

Parasitic animals, 24.

Parotid regions (symptomatology), 89.

Parotis, 89.

Paroxysms, 231.

Passions (etiology), 24, 52; (symptomatology), 110.

Pathognomonic signs, 274.

Pathology, 1; its definition and importance, 1; its extent, 2; divisions, 2; general, 3; its advantages and dangers, 4; principal treatises upon, 444.

Pectoriloquy, 150.

Pellicle, urinary, 217.

Penis (symptomatology), 94.

Percepta (etiology), 52.

Percussion, a method of exploration, 286; mediate, immediate, 287; rules to be observed in its performance, 288; in diseases of the pleura and lungs, 151; of the heart, 170; of the abdomen, 289.

Periodical diseases, 231.

Periodicity of diseases, 233; its causes, 233.

Periods of disease, 233.

Perspiration, 196.

Pharynx (symptomatology), 123.

Phenomena, 72; precursory, 70; value of, in prognosis, 346; consecutive, 262; their progress, 264; duration, 264; diagnostic value, 319; sympathetic, 227.

Phlyctenæ, 85.

Physiognomy in health, 82; in disease, 82; a means of prognosis, 349.

Pica, 118.

Pinched countenance, 82.

Pleurosthotonos, 101.

Plicatures (symptomatology), 80.

Poisons (etiology), 23; their divisions, 23.

Political institutions (etiology), 36.

Popular diseases, 64.

Precursory signs, 70; value of, in prognosis, 346.

Predisposing causes, *vide* Causes.

Predispositions, not to be confounded with predisposing causes, 59.

Pregnancy (etiology), 44; its influence upon the progress of diseases, 240; on their prognosis, 345.

Preludes of diseases, 70.

Presbyopia, 85.

Pressure (diagnosis), 276; differs from palpation, 276; signs which it furnishes, 277.

Primary diseases, 69.

Probes, examination with, 293.

Prodromes, 70.

Professions (etiology), 43.

Prognosis, 341; conditions necessary to its establishment, 341.

Prognostic signs, 342; principal, 348.

Progress of diseases, 230; its importance in prognosis, 347.

Protopathic disease, 69.

Ptoxis, 99.

Ptyalism, 207.

Puerperal state, 345.

Pulse, 170; its frequency according to age, 170; mode of examining, 172; its varieties, 172; venous, 182; critical, 250; its prognostic value, 354.

Pupils (symptomatology), 85.

Purring tremor, 168.

Pus, physical and chemical properties of, 204.

Pyogenia, 201; formation of pus, 201; its displacement, 202; physical and chemical qualities, 204.

R.

Reasoning in medicine, 405.

Recurrence, 265; its causes, 265; symptoms, 265.

Regurgitation, 125.

Relapse, 264; its causes, 264; symptoms, 265.

Remedies, precautionary, a cause of disease, 50; differ from treatment, 427; their number infinite, 427.

Remittent type, 232.

Renvois, 125.

Repercussion, 242.

Residence, 34.

Resolution, 242.

Respiration (symptomatology), 134; frequent, 134; quick, 135; full, 135; small, 135; laborious, 135; painful, 135; suffocating, 135; unequal, 136; irregular, 136; intermittent, 136; interrupted, 136; sighing, 136; plaintive, 136; resembling the sound of a flute, 136; stertorous, 137; rattling, 137.

Respiratory murmur, in its normal condition, 138; is not of equal intensity in all parts of the chest, 138; its modifications in disease, 133.

Restlessness, 76.

Retching, 125.
 Return to health, 242; in general diseases, 243; local diseases, 243; chronic diseases, 244.
 Revolution, diurnal, its influence on the progress of diseases, 237.
 Rhonchi, definition of, 140; crepitant, 140; subcrepitant, 141; mucous, 141; cavernous, 141; sibilant, 144; sonorous, 144.
 Rhythm of the cardiac pulsations, 169.
 Rigidity, 99; a prognostic sign, 349.
 Rigor (symptomatology), 194; as a prognostic sign, 355.
 Risus sardonicus, 89.
 Rumination, 126.

S.

Saliva, 207.
 Satyriasis, 224.
 Scabs, 206.
 Schirrus, 370.
 Serotum, 95.
 Seasons, a cause of diseases, 33; their influence on the seat of diseases, 18; on their progress, 238; on their prognosis, 346.
 Seat of diseases, 16; to determine the, 312; its prognostic value, 344; influence of age upon the, 18; influence of the seasons, 18.
 Secondary diseases, 69.
 Secretions, 206.
 Sediment, 217.
 Semen, secretion and excretion of, 224.
 Sensations, internal, 105; external, 103.
 Sensibility, 104.
 Sexes (etiology), 41.
 Shoulders (symptomatology), 91.
 Sighing respiration, 136.
 Sight, alterations of, 103.
 Signs, differ from symptoms, 72; precursory, 70; diagnostic, 273; their division, 274; prognostic, 342.
 Skin, its various colors, 78; spots, 79; eruptions, 80; plicatures, 80; tumors, excoriations, 81; fissures, fistulæ, ulcers, &c., &c., 81.
 Sleep and the waking state, as causes, 52; symptoms, 113; prognostic value of, 351.
 Sleeplessness, 114.
 Smell, exaltation and diminution of, 109.
 Sneezing, 152.
 Solidists, doctrine of the, 438.
 Somnolency, 115.
 Sopor, 115.
 Souffle, *vide* Respiratory murmur, and Bellows murmur.
 Sounds, respiratory, 138; of the heart, 166; bellows, 167; filing, 167; rasping, 167; musical, 167; sawing, 167; auriculo-metallic, 163; friction, of pleura, 147; pericardium, 163; peri-

toneum, 290; arterial, 179; examination with probes and, 293.
 Species of disease, 266.
 Specific causes, common, 25.
 Speculum, 294; cavities explored by this instrument, 294; mode of its introduction into the vagina and rectum, 295.
 Speech, anomalies of, 103.
 Spitting, 155.
 Sporadic diseases, 64.
 Sputa (symptomatology), 155; their differences, 156; they furnish important prognostic signs, 354.
 Sputum, 156.
 Stages, 236.
 Stationary diseases, 64.
 Statistics, medical, 393; its application, 393; objections to it, with their refutation, 395.
 Sterility, 226.
 Stammering, 103.
 Strangury, 211.
 Stature, rapid increase of, a prognostic sign, 349.
 Strength, 356; estimation of the, 408; oppression of the, 411; therapeutical indications furnished by the state of the, 408.
 Stupor, 82.
 Subsultus tendinum (symptomatology), 99; as a prognostic sign, 349; epigastric, 125.
 Succussion, abdominal, 282; thoracic, 146.
 Supervenientia, 229.
 Suppuration, 204, 242.
 Suspension in the urine, 217.
 Sympathetic phenomena, 227; render diagnosis obscure, 323.
 Sympathies, morbid, 227.
 Symptomatic phenomena, considered in relation to diagnosis, 319.
 Symptomatic diseases, 69.
 Symptomatology, 72.
 Symptoms, 72; differ from signs and phenomena, 72; division of Boerhaave, of Bayle, 73; order followed in their exposition, 74; primary or local, 227; secondary or general, 227; sympathetic, 227; idiopathic, 153; principal, 228; accessory, 228; active, 229; passive, 229; of a symptom, 230; of a cause, 230.
 Syncope, 116.
 Synonymy of diseases, 15.

T.

Taste (symptomatology), 109.
 Tears, 207.
 Teeth (symptomatology), 118.
 Temperaments (etiology), 41.
 Temples, 88.
 Tenesmus, 130; vesical, 211.

Termination of diseases, 242; by their curc, 242; by death, 244; by the supervision of another disease, 245.

Testicles (symptomatology), 95.

Therapeutics, 380; its bases, observation, 381; and experience, 403; employment of reasoning, 405; application of chemical knowledge, 405.

Thirst (symptomatology), 118; a prognostic sign, 352.

Time, between the application of the cause and the development of the disease, 69.

Tinkling, metallic, 145.

Tongue, in health, 119; in disease, 119; its volume, 120; form, 120; motions, 120; color, 120; coats, 121; humidity, 122; eruptions, 122; temperature, 123; sensibility, 123; signs which it furnishes for prognosis, 352.

Touch, sense of (symptomatology), 109; exploration by the, 280; mode of its performance, 280; by the vagina, 280; the signs it furnishes, 281; by the rectum, 281; in the pharynx, 282.

Transformations, morbid, 372; cartilaginous, 373; cutaneous, 372; fibrous, 373; fatty, 372; horny, 373; mucous, 372; osseous, 373; serous, 372.

Trembling, 99.

Trismus, 101.

Tubercles, 363.

Tumors, 81.

Tunica vaginalis, 95.

Tympanites, 93.

Type of diseases, 231; continued, 231; periodical, 231; varieties of intermittent, 231; remittent, 232; an element in their diagnosis, 320.

U.

Ulcers, 367.

Univocal signs, 274.

Urine, the normal properties of, 210; the changes in its physical and chemical properties, and in its excretion, 211; its deposits, 217.

V.

Vapors, metallic (etiology), 25.

Variations of the atmosphere, 32; their influence upon the progress of diseases, 238.

Varieties of disease, 270.

Veins (symptomatology), 181.

Venomous secretions, 26.

Vertigo, 116.

Vessels, lymphatic (symptomatology), 189.

Vibices, 80.

Virus, 26; *vide* Contagious principles.

Vision, 108.

Voice, 102; auscultation of the, 148.

Volume of the body, 76.

Vomited matters, 126.

Vomiting, 126; sympathetic, 126.

W.

Winds, influence of the, 32.

Y.

Yawning, 152.

Years, climacteric, 40.

